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THE
SCIENCE OF MUSIC

A TREATISE

ON

THE SCIENCE OF MUSIC,

EXPLAINING ITS PRINCIPLES IN A MANNER SUITABLE TO THE
PURPOSES OF GENERAL EDUCATION,

BY

AN AMATEUR.

"Untwisting all the chains that tie
The hidden soul of Harmony."
MILTON.

LONDON:
JOHN W. PARKER AND SON, WEST STRAND.

1861.

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PREFACE.

An acquaintance with the Science of Music, that is, with the principles of the system on which the constituent sounds of any air or piece of music, and the successions and combinations of those sounds, depend, is not, in this age and country at least, a very ordinary acquisition. Yet its importance to the very numerous class of musical performers is unquestionable; and even to others it may be reasonably recommended, as a graceful branch of general education; indispensable as it is to the power of fully appreciating the works of the great masters, and to the formation of a critical judgment and a true taste with regard to musical compositions in general. Its rarity is attributable, in some degree, to the peculiar dryness and difficulty by which the study of this science is found to be attended. The Author indulges the hope, that the amount of these discouragements will in the present work be diminished, by the attempt made to give the reader a better insight than he elsewhere usually obtains, into the systematic connection of the different subjects referred to; and by the circumstance that only summary notice is taken of some particular musical topics, followed up in laborious detail in many of the treatises, but not requiring, as it seems, to be so dealt with, in a work intended, like this, for the instruction of the general reader. The fatigue which the perusal of a scientific work on Music is apt to occasion, will also perhaps, in the present case, be somewhat relieved by the insertion, which the Author has been led to make, of a few illustrative examples from great composers. These will chiefly be found in the Appendix of Notes, together with some other matters which tend to a similar relief, as being rather of an interesting or curious, than of a didactic, character.

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CHAPTER I.

OF THE SCALE, OF MODES, OF NOTATION, OF KEYS, OF TIME, AND OF ACCENT.

A note is any musical sound; that is, any sound giving pleasure to the ear.

The ear distinguishes notes from each other in various respects, and, among others, in respect of *height;* a difference which has been ascertained by experiment to depend upon the relative number of vibrations made in a given time by each of the sounding bodies; a body whose vibrations are more frequent, emitting a higher note than one whose vibrations are less frequent.

The degree of the height of a note is called its *pitch;* and the amount of the difference of pitch between any two notes is called the *interval* between them.

The *scale* is a series of notes, each successively ascending or descending in pitch, at certain prescribed intervals from each other.

The number of notes in the scale is eight; and they are denominated (counting upwards) as the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th; the 8th being also called the *octave* of the 1st.

Any note or musical sound whatever may be made the first of a series; so that the scale determines nothing as to the particular notes comprised in it; it only determines their number and the intervals at which they stand in respect to each other.

The 1st and 8th notes of the scale are in such relation to each other, that, though differing considerably in pitch, they are nevertheless felt by the ear to be very similar, or in a manner identical; a circumstance owing to the simplicity of the ratio (viz. 1 : 2) between the numbers of the vibrations of the strings, or other sounding bodies, by which these notes are respectively emitted.

The eight notes of the scale collectively are said to be the *key* of the 1st note, and that note is consequently called the *key note.* Thus, if the scale begins with the note known among musicians as C, the eight notes of which this is the 1st are called the key of C, and C is called the 1st of the key or (more usually) the *key note.*

The intervals comprised in the scale, as between *contiguous* notes, are of two kinds—the one greater, called a *tone* (or a *second*), the other less, called a *semitone;* some notes having a tone between them, and some a semitone.

The scale admits of two different arrangements, as to the order of succession of the tones and semitones; one arrangement being called the *major mode,* and the other the *minor mode.*

The first arrangement, that is, the major mode, is as follows :

(Ascending)—Tone, tone, semitone, tone, tone, tone, semitone.

(Descending)—The same reversed.

The second arrangement, that is, the minor mode, is as follows :

(Descending)—Tone, tone, semitone, tone, tone, semitone, tone.

(Ascending)—The same reversed, subject to certain variations *, to be afterwards explained.

---

* Vide post, p. 12, 13.

From what has been said, it may be collected that the system admits, in either mode, a variety of keys; because any note whatever may form the first of the series, and, with the seven notes that follow, will consequently constitute a key. It remains, however, to explain more particularly the manner in which the several keys are produced.

And, first, in the major mode.

Some particular sound being first fixed *, and a name (suppose C) assigned to it, it is then made to form the 1st or key note of the key of C; the notes of which are designated (ascending) C, D, E, F, G, A, B, $\bar{C}$; for the 8th (or octave of the 1st) being in a manner the same (as already explained) with the 1st, is denominated by the same letter. And as the upper C may in turn be made the 1st of a similar series ascending, and the lower (or original) C the 1st note of a similar series descending (every note in each new series being tuned an octave to, or replicate of, the note of the same denomination in the first or original series), and as this progression may be pursued to any extent, until the sounds become too high or too low to be musical †, we have thus a considerable number of sets or *octaves* (for the word has this *collective* sense also) of the key of C, differing from each other only in pitch.

This key of C (in the major mode), with its intervals of tones and semitones marked below the letters, will be as follows (*ascending*):

C D E F G A B $\bar{C}$‡
| tone | tone |semi| tone | tone | tone |semi|

and this expresses, not only the 1st or original octave, but all the others.

But here it becomes necessary, at the expense of some digression, to explain the manner of designating notes, or, as it is called, the subject of *notation.*

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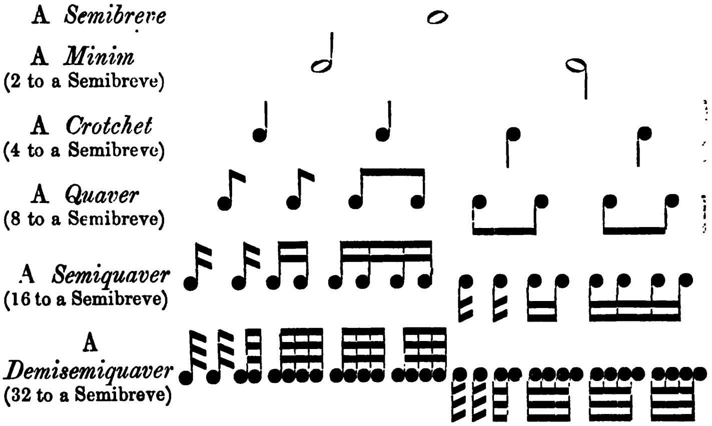
* See Appendix, Note (A).

† See Appendix, Note (B).

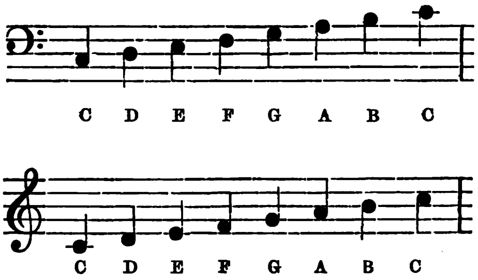
‡ A dash over a letter, as here, will be used in this work to express a higher octave. Thus, $\bar{C}$, means the note that is an octave above C

The letters C, D, E, F, G, A, B, C, constitute (as we have seen) the *names* of the notes; but are themselves expressed to the eye, not usually by their alphabetical characters, but by other characters placed on *staves* (as they are called), that is, on groups of parallel lines, and on the spaces intervening between them.

These characters are of different forms, for the purpose of expressing their relative value to each other as regards *time,* or the duration of the sound; and are, with their relative values, set forth in the following Table:



The number of lines in the staves, on which these characters are written, are five; but other short ones, called *ledger lines,* are added above and below the main body of the staff, as occasion requires. The staves bear also certain marks called *Clefs,* of which two only are now popularly used, and are as follows: 𝄢 and 𝄞; the former being called the F or bass clef, the latter the G or treble clef. The bass clef is placed on the fourth line of the staff, counting upwards, and signifies that the note F (at a certain pitch called by musicians *bass*) is to be placed on that line. The treble cleff is placed on the second line of the staff, counting upwards, and signifies that the note G (at the pitch called by musicians treble, and which is higher than the bass) is to be placed on that line. The place of one particular note being thus fixed in each of the staves on which these clefs are put, determines of course the place of all the remaining ones; and the two clefs each designate a series (one at bass and the other at treble pitch) of the same notes, C, D, E, F, G, A, B, C, each of which has its own place in the staff to which that particular clef is attached. All this will be more clearly understood by the following representation of two staves, one in the bass, and the other in the treble clef, with the characters of the notes (in this case supposed to be *crotchets*) in our original key of C, placed in due order upon the lines and spaces, and the alphabetical letters subjoined to each note, for the purpose of clearer explanation



It is to be observed, that in the first staff the upper C is the same note as the lower C in the second staff, and at the same pitch. The two staves together, therefore, give two consecutive octaves, and by increasing the number of ledger lines (of which only one is, in this example, used in each staff, viz. one at the last note, and another at the first), the pitch in each staff may be yet further extended upwards and downwards. It is found, in practice, that these two clefs (without more), extended as occasion may require by ledger lines, are in general sufficient. A greater variety of denomination, indeed, than bass and treble, is used to express the difference of pitch; four principal degrees of elevation being recognised in reference to this subject, viz. *bass*, *tenor*, *alto*, and *treble*, which lie in that order (ascending) with respect to each other; and each of these parts (besides several others) had formerly always its separate clef*; but, to avoid so inconvenient a variety of notation, the bass and treble clefs are now used almost exclusively, and it is in the range of the connected series of notes which they together comprise, that all sounds, of whatever pitch, find their place†.

To return to the subject of keys; our consideration of which for the present has been confined to the key of C. We are next to explain how other keys are added to the system. To effect this, it is obvious to proceed in the first place by making *others* of the original notes, viz. D, E, F, G, A, B, successively form the key note, instead of C. They are not taken, however, in that order; the note first employed for the purpose being the fifth note ascending from C, viz. G. Taking G then as the new key note, the series of the new key, supposing all the old notes to be retained, would be as follows, viz. G, A, B, C, D, E, F, $\overline{G}$‡. But such a series would be incorrect, not being in conformity with the scale; the obligation to conform to which, is of course common to every key. It would differ from the scale (supposing the mode to be major) in respect of the note F, the 4th of the original key of C, and the 7th of the new key. For, on recurring to the key of C as arranged according to the scale§, it will be found that, of the two semitones comprised in the scale, one falls between the 3rd and 4th notes, viz. between E and F, and the other between the 7th and 8th, viz. between B and $\overline{C}$; but, in the new key of G, the interval between the 7th and

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* See Appendix, Note (C).

† See Appendix, Note (D).

‡ It is obvious that, besides $\overline{G}$,—C, D, E, and F also will each be an octave higher than the same note in the original key, and in strictness therefore should be marked $\overline{C}$, $\overline{D}$, $\overline{E}$, $\overline{F}$. But that particularity of notation would prove inconvenient for our present purpose.

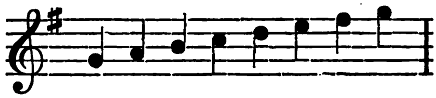
§ Vide sup. p. 3.

8th, viz. between F and Ḡ, would *not* be a semitone, but a whole tone; as will be apparent, by again recurring to the key of C*, where the interval from F to G is a tone. And the error here pointed out does not proceed from Ḡ's being too high; for Ḡ, being a true octave to G, is right; but it proceeds from F's being too low; and it is F, therefore, that requires correction. To correct it, we must introduce, for the key of G, a different 7th, and one that shall be a semitone higher than F, so as to be a semitone only (as the scale requires) below Ḡ. This new note might be denominated by a different letter; but it is more convenient to retain the F, and give it a mark expressive of its being a semitone higher than the F of the original key. It is, therefore, denominated *F sharp,* and marked *F♯;* for it is part of the method of notation in music, that this mark ♯ (called a *sharp*) raises the note, before or after which it is placed, a semitone; this mark ♭ (called a *flat*) lowers the note a semitone; and this mark ♮ (called a *natural*) restores it from flat or sharp to its original sound.

The new key will then be as follows:

G, A, B, C, D, E, F♯, Ḡ;

or, according to the ordinary notation (in the treble clef),



the sharp being placed, not at the note F itself, but at the commencement of the staff, so as to point out the key more distinctly as the key of G, or one sharp,—for the key is denominated either way.

Upon the same principle, it will be found, that as we began with G, the 5th ascending from the original key note C, so, if the same progression of ascending 5ths be pursued, the effect will be to introduce at each new key one additional sharp, by way of correcting its 7th note. Thus:

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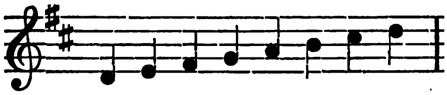
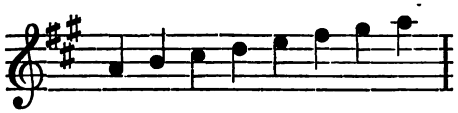
* Vide ibid.

Make D, the 5th from G, the key note, and its key will be D, E, F♯, G, A, B, C♯, D̄; or, according to the ordinary notation (in the treble clef),



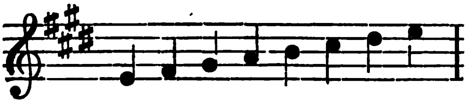
and it is called the key of D, or two sharps. For as a sharp was added in the former case to F, the 4th note of the original key of C, in order to make it a correct 7th for the new key of G; so in like manner a sharp is now added to C, the 4th note of the key of G, in order to make it a correct 7th for the new key of D.

And so pursuing the same principle throughout, make A, the 5th from D, the key note, and its key will be A, B, C♯, D, E, F♯, G♯, Ā; or, according to the ordinary notation (in the treble clef),



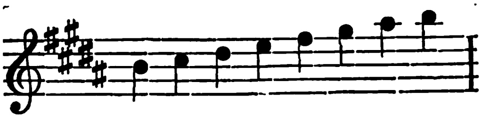
and it is called the key of A, or three sharps.

Make E, the 5th from A, the key note, and its key will be E, F♯, G♯, A, B, C♯, D♯, Ē; or, according to the ordinary notation (in the treble clef),



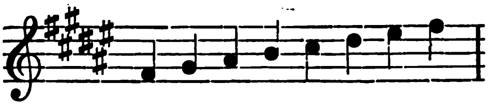
and it is called the key of E, or four sharps.

Make B, the 5th from E, the key note, and its key will be B, C♯, D♯, E, F♯, G♯, A♯, B̄; or, according to the ordinary notation (in the treble clef),



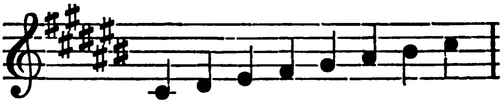
and it is called the key of B, or five sharps.

Make the newly acquired F♯ (which is the 5th from B) the key note, and its key will be F♯, G♯, A♯, B, C♯, D♯, E♯, $\overline{\text{F}}$♯; or, according to the ordinary notation (in the treble clef),



and it is called the key of F sharp, or six sharps.

Make the newly acquired C♯ (which is the 5th from F♯) the key note, and its key will be C♯, D♯, E♯, F♯, G♯, A♯, B♯, $\overline{\text{C}}$♯; or, according to the ordinary notation in the treble clef),



and it is called the key of C sharp, or seven sharps.

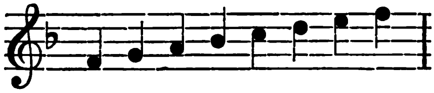
There being now seven sharps in the key (beyond which the notation by sharps cannot be carried, as a sharp is already applied to every note in the system), the progression by 5ths is abandoned; and the next resort is to the progression by 4ths. And, first, the note F (the 4th of the original key of C) is taken as the key note of a new key. If all the old notes were retained thus—

F, G, A, B, C, D E, $\overline{\text{F}}$,

the note B, the 4th of the new key (being the 7th of the key of C) would then be erroneous; on the same principle as, in the key of G, the note F (the 7th of that key and 4th of the key of C) was erroneous. For, on recurring to the key of

C, as arranged according to the scale*, we find that the 4th ought to be only a *semitone* above the 3rd; whereas B, as appears by the same arrangement, is a *whole tone* above A.

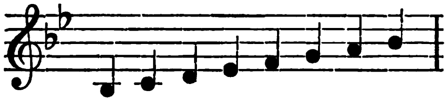
To correct this, therefore, the method is to *lower* B a semitone; introducing for that purpose a note called B flat (or B♭), upon the same principle that, in the key of G, the F was *heightened,* and became F sharp (or F♯). The new key will then be F, G, A, B♭, C, D, E, $\bar{\mathrm{F}}$; or, according to the ordinary notation (in the treble clef),



and it is called the key of F, or one flat.

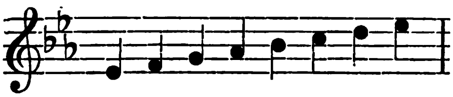
And so, pursuing the same principle of progression by ascending 4ths, the effect will be to introduce, at each new key, one additional flat, by way of correcting, for the 4th of the new key, the 7th of the last preceding one. Thus:

Make B♭ (the 4th from F) the key note, and its key will be B♭, C, D, E♭, F, G, A, $\bar{\mathrm{B}}$♭; or, according to the ordinary notation (in the treble clef),



and it is called the key of B♭, or two flats.

Make E♭ (the 4th from B♭) the key note, and its key will be E♭, F, G, A♭, B♭, C, D, $\bar{\mathrm{E}}$♭; or, according to the ordinary notation (in the treble clef),



and it is called the key of E♭, or three flats.

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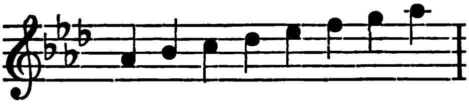
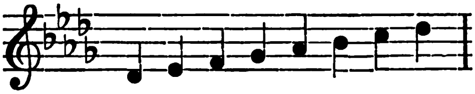
* Vide sup. p. 3.

Make A♭ (the 4th from E♭) the key note, and its key will be A♭, B♭, C, D♭, E♭, F, G, $\bar{\text{A}}$♭; or, according to the ordinary notation (in the treble clef),



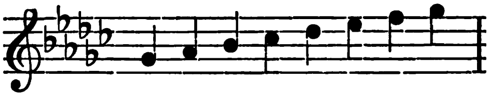
and it is called the key of A♭, or four flats.

Make D♭ (the 4th from A♭) the key note, and its key will be D♭, E♭, F, G♭, A♭, B♭, C, $\bar{\text{D}}$♭; or, according to the ordinary notation (in the treble clef),



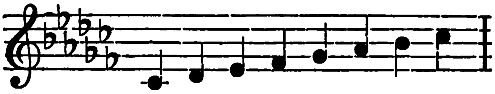
and it is called the key of D♭, or five flats.

Make G♭ (the 4th from D♭) the key note, and its key will be G♭, A♭, B♭, C♭, D♭, E♭, F, $\bar{\text{G}}$♭: or, according to the ordinary notation (in the treble clef),



and it is called the key of G♭, or six flats.

Make C♭ (the 4th from G♭) the key note, and its key will be C♭, D♭, E♭, F♭, G♭, A♭, B♭, $\bar{\text{C}}$♭; or, according to the ordinary notation (in the treble clef),



and it is called the key of C♭, or seven flats; beyond which the notation by flats cannot be carried, as there is a flat already applied to every note in the system.

The result, therefore, on the whole, is that we have 15 keys in the major mode; viz. the original key of C (which, being without sharps or flats, is termed the *natural* key), 7 keys with sharps, and 7 with flats *. Thus:

By ascending 5ths
C ——— natural.
G ——— 1 sharp.
D ——— 2 sharps.
A ——— 3 sharps.
E ——— 4 sharps.
B ——— 5 sharps.
F♯ ——— 6 sharps.
C♯ ——— 7 sharps.

By ascending 4ths
F ——— 1 flat.
B♭ ——— 2 flats.
E♭ ——— 3 flats.
A♭ ——— 4 flats.
D♭ ——— 5 flats.
G♭ ——— 6 flats.
C♭ ——— 7 flats.

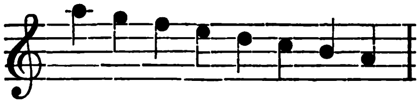
But of these, keys with more than 5 sharps or 5 flats are not generally used.

In the *minor* mode †, the number of keys is the same, and their arrangement is upon the same principle: though, in this case, A (the 6th ascending from C) is taken (instead of C) for the original note; and the progression is first by ascending 4ths, and afterwards by ascending 5ths.

The key of A, when arranged according to the minor mode, will be as follows (*descending*):

A G F E D C B A
| tone | tone |semi| tone | tone |semi| tone |

or, according to the ordinary notation (in the treble clef),



and it is called the key of A *minor*.

It is to be observed, however, that, in the *ascending* scale of any key in the minor mode, the 7th note is always *augmented;*

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* See Appendix, Note (E).

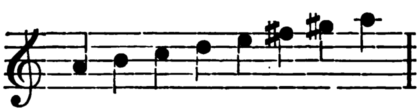
† Vide sup. p. 2.

that is, made a semitone * sharper than it is when it forms the second note of the proper or descending scale; which makes the highest interval, *ascending*, a semitone, as in the major mode †; and the 7th note being thus dealt with, a corresponding change is usually made on the 6th note also, in order to prevent the anomaly which would otherwise occur, of an interval *greater* than a tone between the 6th and 7th ‡.

Therefore, in A minor, *ascending*, the series will be

A, B, C, D, E, F♯, G♯, $\bar{A}$;

or, according to the ordinary notation (in the treble clef),



the 6th, F♯, and the 7th, G♯, being *augmented* notes, and foreign to the proper or descending scale.

In the particular key of A minor (in its descending scale), it is also to be observed, that (as shown in the last preceding page) no ♯ or ♭ requires to be introduced. It is consequently termed the *natural* key in that mode, as C is in the major. These keys of A minor and C major are also said to be *relative* to each other; and so are all the keys in the major and minor modes respectively, which are connected with each other in the same manner, that is, comprise the same notes differently arranged.

But in the other keys of the minor mode, flats or sharps require to be introduced, as in the case of the major mode; the introduction, however, being at the 3rd or 7th note descending of each new key, instead of the 7th or 4th ascending. Thus, if we proceed by a progression first of ascending 4ths, and then of ascending 5ths (which in this mode is the most convenient order), the next key to A minor will have D for its key note, and will be as follows, differing (it will be observed) from A minor, by the introduction of a ♭ at B, the 3rd note descending:

---

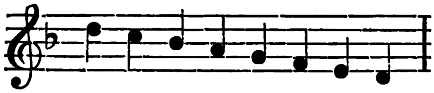
* That is a *chromatic* semitone; as to which, vide post, p. 28.

† See Appendix, Note (F).

‡ See Appendix, Note (G).

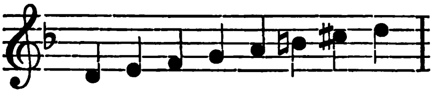
(*Descending*)
D, C, B♭, A, G, F, E, D;

or, according to the ordinary notation (in the treble clef),



(*Ascending*)
D, E, F, G, A, B, C♯, D;

or, according to the ordinary notation (in the treble clef),



and it is called the key of D, or one flat, minor *.

And so of the rest.

The fifteen keys in the minor mode, according to the progression, first, of ascending 4ths, and next of ascending 5ths, will be found to be as follows:

A ——— natural (relative to C major).
By ascending 4ths.
D ——— 1 flat (relative to F major).
G ——— 2 flats (relative to B♭ major).
C ——— 3 flats (relative to E♭ major).
F ——— 4 flats (relative to A♭ major).
B♭ ——— 5 flats (relative to D♭ major).
E♭ ——— 6 flats (relative to G♭ major).
A♭ ——— 7 flats (relative to C♭ major).

By ascending 5ths.
E ——— 1 sharp (relative to G major).
B ——— 2 sharps (relative to D major).
F♯ ——— 3 sharps (relative to A major).
C♯ ——— 4 sharps (relative to E major).
G♯ ——— 5 sharps (relative to B major).
D♯ ——— 6 sharps (relative to F♯ major).
A♯ ——— 7 sharps (relative to C♯ major).

But of these, keys with more than 5 sharps or 5 flats are not generally used.

---

* See Appendix, Note (H).

It may be useful here to subjoin a synopsis of the fifteen keys in each mode.

SYNOPSIS OF KEYS.

MAJOR MODE.

C	D	E	F	G	A	B	C
G	A	B	C	D	E	F♯	G
D	E	F♯	G	A	B	C♯	D
A	B	C♯	D	E	F♯	G♯	A
E	F♯	G♯	A	B	C♯	D♯	E
B	C♯	D♯	E	F♯	G♯	A♯	B
F♯	G♯	A♯	B	C♯	D♯	E♯	F♯
C♯	D♯	E♯	F♯	G♯	A♯	B♯	C♯
F	G	A	B♭	C	D	E	F
B♭	C	D	E♭	F	G	A	B♭
E♭	F	G	A♭	B♭	C	D	E♭
A♭	B♭	C	D♭	E♭	F	G	A♭
D♭	E♭	F	G♭	A♭	B♭	C	D♭
G♭	A♭	B♭	C♭	D♭	E♭	F	G♭
C♭	D♭	E♭	F♭	G♭	A♭	B♭	C♭

MINOR MODE.

	A	B	C	D	E	F	G	A	Descending. ←
Ascending →	A	B	C	D	E	F♯	G♯	A	
	D	E	F	G	A	B♭	C	D	Descending.
Ascending	D	E	F	G	A	B	C♯	D	
	G	A	B♭	C	D	E♭	F	G	Descending.
Ascending	G	A	B♭	C	D	E	F♯	G	
	C	D	E♭	F	G	A♭	B♭	C	Descending.
Ascending	C	D	E♭	F	G	A	B	C	
	F	G	A♭	B♭	C	D♭	E♭	F	Descending.
Ascending	F	G	A♭	B♭	C	D	E	F	
	B♭	C	D♭	E♭	F	G♭	A♭	B♭	Descending.
Ascending	B♭	C	D♭	E♭	F	G	A	B♭	
	E♭	F	G♭	A♭	B♭	C♭	D♭	E♭	Descending.
Ascending	E♭	F	G♭	A♭	B♭	C	D	E♭	
	A♭	B♭	C♭	D♭	E♭	F♭	G♭	A♭	Descending.
Ascending	A♭	B♭	C♭	D♭	E♭	F	G	A♭	
	E	F♯	G	A	B	C	D	E	Descending.
Ascending	E	F♯	G	A	B	C♯	D♯	E	
	B	C♯	D	E	F♯	G	A	B	Descending.
Ascending	B	C♯	D	E	F♯	G♯	A♯	B	
	F♯	G♯	A	B	C♯	D	E	F♯	Descending.
Ascending	F♯	G♯	A	B	C♯	D♯	E♯	F♯	
	C♯	D♯	E	F♯	G♯	A	B	C♯	Descending.
Ascending	C♯	D♯	E	F♯	G♯	A♯	B♯	C♯	
	G♯	A♯	B	C♯	D♯	E	F♯	G♯	Descending.
Ascending	G♯	A♯	B	C♯	D♯	E♯	F♯♯	G♯	
	D♯	E♯	F♯	G♯	A♯	B	C♯	D♯	Descending.
Ascending	D♯	E♯	F♯	G♯	A♯	B♯	C♯♯	D♯	
	A♯	B♯	C♯	D♯	E♯	F♯	G♯	A♯	Descending.
Ascending	A♯	B♯	C♯	D♯	E♯	F♯♯	G♯♯	A♯	

Such is the manner in which the several keys are constructed; a subject which we shall close by adverting to the degree of propinquity which exists between different keys, so as to render the transition from one to the other more or less natural.*

There is obviously a greater propinquity between some keys than between others. The greatest is that which exists between the following, viz. keys which are *relative* † to each other, that is, have altogether the same notes, though in different modes; for example, C major and A minor:—and keys which *differ by a single note,* for example, C major and G major, C major and F major, C major and E minor, and C major and D minor. But as between keys differing by a single note, those which are in the same mode, as in the two first of these examples, are more nearly connected than those which are in different modes, as in the two last.

We shall conclude the chapter by giving some account of that important part of the system of music which is commonly expressed by the word *Time;* and the closely connected subject of *Accent.*

Time regards either the *absolute* duration of sound allowed to different notes; or their *relative* duration as compared to one another; or the number of notes of the same relative duration respectively comprised in the different divisions of a piece of music.

On the *absolute* duration of the notes depends the character of a piece of music, as *quick* or *slow;* and on this not much requires to be said, the time in this sense being according to the fancy of the composer, who points it out by such words, placed at the beginning of the movement, as are contained in the following table, expressing the different gradations from slow to quick.

Adagio.
Lento.
Largo.
Larghetto.

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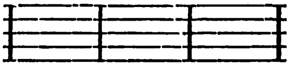
[*] As to such transition, see further *post,* under the head Modulation.

[†] Vide sup. p. 13.

Andante.
Andantino.
Allegretto.
Allegro.
Presto.
Prestissimo.

On the *relative* time of the notes it is also unnecessary to dwell, as it was sufficiently explained in a former place *, where the different forms and denominations of the notes, and their duration as compared with each other, were set forth. But time, in the third sense, requires more consideration, and it may be explained as follows:

Every piece of music is divided into small sections, called *bars,* drawn across the staff, thus  each of which is to contain the same number of notes of a given relative duration (or an equivalent for that number); for example —four crotchets or three quavers (or their equivalent respectively); the time of the piece, if the number be divisible by two (as in the case of four crotchets) being called *common time;* if divisible by three and not by two (as in the case of three quavers), *triple time.* And this contains the essence of the matter in a few words. But as to equivalents, some further explanation is required, and may be given as follows:

First. Instead of the limited number of notes of given duration, any bar may comprise such notes as are equivalent. Thus, instead of four crotchets, a bar may comprise two minims, which are equivalent; or three crotchets and two quavers, which are equivalent.

Secondly. If a dot be placed after any note, it is lengthened by half its value. Thus, a dotted crotchet ♩. is as long as a crotchet and a quaver, or three quavers.

Thirdly. Instead of any of the notes of given duration, its equivalent *rest* may be taken; that is, a pause, in which no note is sounded, but which lasts as long as a note of the given duration would have lasted, supposing it to have been sounded. Thus, instead of four crotchets, a bar may comprise three crotchets and a crotchet *rest*. And here it may be proper to set forth the different signs by which the rests are expressed, which are as follows:

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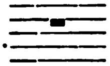
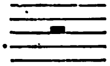
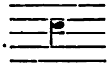
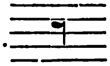
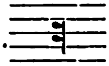
* Vide sup. p. 4.

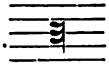
Semibreve Rest................. 

Minim Rest...................... 

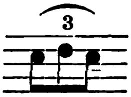
Crotchet Rest.................. 

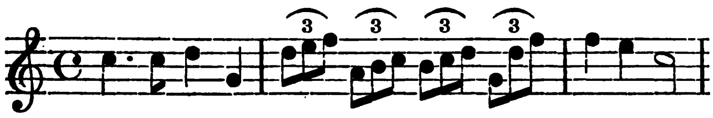
Quaver Rest.................... 

Semiquaver Rest............... 

Demisemiquaver Rest.......... 

As to which, it is further to be understood, that the *rest* of a note, as well as the note itself, may be *dotted*, and with the same effect, viz. that it makes the *rest* one half longer.

Fourthly. If three notes have a curve drawn over them, with the number 3 included, thus  which is called a *triplet**, these notes are by a sort of license performed in the same time as two notes of the same value would be. So there may be groups of triplets, to each of which the same license applies; thus:



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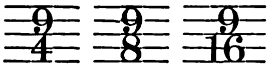
* The number 3 is often omitted.

Common Time, in its simple form, contains four crotchets, or their equivalent, and is marked thus at the beginning of the movement, 𝄴*; or it contains two crotchets, or their equivalent (often called *half time*), and it is marked thus at the beginning of the movement: $\genfrac{}{}{0pt}{}{2}{4}$

And here it is to be observed, that in all cases, where figures are thus used in reference to time, the lower one, if a 2, indicates *minims;* if a 4, *crotchets;* if an 8, *quavers;* if a 16, *semiquavers* (these being expressive of the several proportions borne by these notes to a semibreve); and the upper figure shews how many of such notes are contained in a bar, or (as it is otherwise expressed) shews the number of *parts* that a bar contains.

Triple time, in its simple form, contains either three minims, three crotchets, or three quavers (or their equivalents) in a bar, and is marked $\genfrac{}{}{0pt}{}{3}{2}$ $\genfrac{}{}{0pt}{}{3}{4}$ $\genfrac{}{}{0pt}{}{3}{8}$ in these several cases respectively.

Common time, however, is sometimes in a compound form, called *compound common time,* and contains six crotchets in a bar, six quavers in a bar, twelve quavers in a bar, or twenty-four semiquavers in a bar, or their equivalents; and is marked $\genfrac{}{}{0pt}{}{6}{4}$ $\genfrac{}{}{0pt}{}{6}{8}$ $\genfrac{}{}{0pt}{}{12}{8}$ $\genfrac{}{}{0pt}{}{24}{16}$ in these cases respectively †.

Triple time is also sometimes in a compound form, which is called *compound triple time;* and contains nine crotchets, nine quavers, or nine semiquavers in a bar, or their equivalents; and is marked  in these cases respectively *.

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* Common time is also sometimes marked 𝄵 when it is called *Alla-breve* time. In this case the notes are sounded rather more quickly than in other Common time.

† See Appendix, Note (I).

Accent consists in laying stress upon certain *parts* of a bar, as compared with the other *parts;* and the observance of it is essential to the expression and general effect of musical porformance.

In time marked C, the accent is on the first and third parts of the bar, that is (supposing the time to be counted or beat), on numbers 1 and 3.

In $\frac{2}{4}$ time, the accent is on the first.

In $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$ time, the accent is on the first; or, according to some authorities, on the first and third, though less strongly on the third than on the first.

In $\frac{6}{4}$ or $\frac{6}{8}$ time, the accent is on the first and fourth parts.

In $\frac{9}{4}$ or $\frac{9}{8}$ time, the accent is on the first, fourth, and seventh.

The accented parts are usually called the *strong* parts in a bar; the unaccented, the *weak.*

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* See Appendix, Note (K).

CHAPTER II.

OF CHORDS IN GENERAL, AND OF SOME PARTICULAR CHORDS.

A CHORD is a combination of any number of notes struck together.

That department of music which relates to chords and their progression is called *Harmony;* while the term *Melody* is used to express that which relates to a succession of single notes. Both terms, however, are also applied in a somewhat different way. For that succession of single notes which constitutes the leading part or *air,* is also technically called the *melody* of the piece; and so, when the notes of a melody are made to form parts of chords, the chords are said to be a *harmony* to (or to *harmonize*) the air or melody.

Some of the notes of the scale, when the subject of harmony is concerned, usually receive denominations different from those otherwise belonging to them *. The 1st or key note is in that case called the *tonic* (a term, however, precisely coincident in meaning with the *key note*); the 5th ascending, the *dominant;* the 4th ascending, the *subdominant;* and the 7th ascending, the *leading note;* terms of which some further account will be found in the Appendix †.

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* As to the denominations of the notes when harmony is not concerned, v. sup. p. 1.

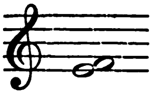
† See Appendix, Note (L).

In proceeding further to discuss the subject of chords (or *harmony*), we must in the first place enter into some further investigation of *Intervals**; of which only those have been hitherto mentioned which lie between *contiguous* notes of the scale†; the much larger number, contained between notes *not* contiguous, not having been yet noticed.

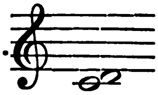
The following table exhibits examples of all those, of both kinds, which lie between two notes not more than an octave from each other (called *simple* intervals).

TABLE OF THE SIMPLE INTERVALS OF THE SCALE.

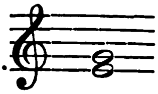
A *Semitone*...



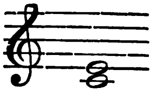
A *Second* (or *Tone*)...................................



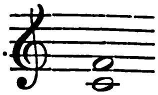
A *Minor Third*‡ (consisting of a tone and a semitone)...............................



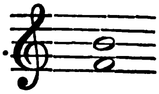
A *Major Third* (two tones) ....



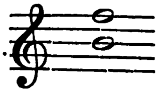
A *Fourth* (two tones and a semitone).................



A *Tritone* (three tones).................................



A *Minor Fifth* (two tones and two semitones)......



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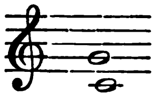
* For the *ratios* of all the different Intervals (a subject passed over in this place), v. post, chap. iv.

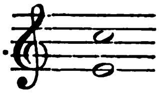
† Vide sup. p. 2.

‡ Sse Appendix, Note (M).

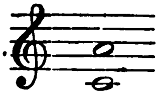
A *Major Fifth,* or a *Fifth* simply (three tones and a semitone). ....



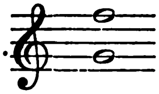
A *Minor Sixth* (three tones and two semitones)...



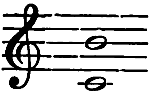
A *Major Sixth* (four tones and a semitone)..........



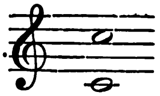
A *Minor Seventh* (four tones and two semitones) ...



A *Major Seventh* (five tones and a semitone). ... ...



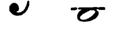
An *Eighth,* or *Octave* (five tones and two semitones).



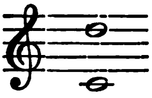
A second class of intervals consist of the former altered, by having the higher of their constituent notes raised, or the lower depressed, one octave, or several octaves; so that an interval of this class may be said to be *compounded* of an octave, double octave, &c with one of the other intervals of the former class; and the distinction between the two is accordingly marked, by giving the name of *simple* intervals to the former class, and *compound* intervals to the latter. Examples of compound intervals are exhibited in the following Table.

TABLE OF COMPOUND INTERVALS OF THE SCALE.

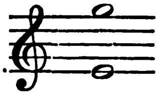
A *Ninth* (minor), being an octave compounded with a semitone......... ....



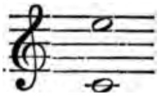
A *Ninth* (major), being an octave compounded with a second.... ....



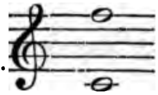
A *Tenth* (minor), being an octave compounded with a minor third....................



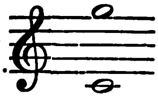
A *Tenth* (major), being an octave compounded with a major third....................



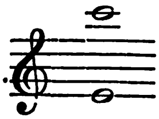
An *Eleventh,* being an octave compounded with a fourth....................................



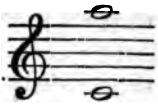
A *Twelfth,* being an octave compounded with a fifth......... ....



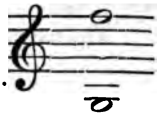
A *Thirteenth* (minor), being an octave compounded with a minor sixth....................



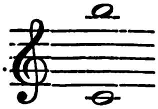
A *Thirteenth* (major), being an octave compounded with a major sixth.....................



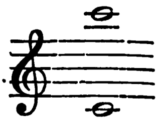
A *Fourteenth* (minor), being an octave compounded with a minor seventh.................



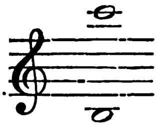
A *Fourteenth* (major), being an octave compounded with a major seventh.................



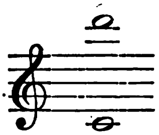
A *Fifteenth,* being an octave compounded with an octave; or a double octave............



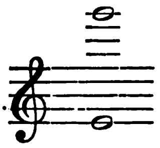
A *Sixteenth* (minor), being a double octave compounded with a semitone..............



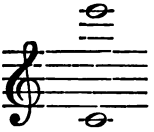
A *Sixteenth* (major), being a double octave compounded with a second ....



A *Seventeenth* (minor), being a double octave compounded with a minor third.........



A *Seventeenth* (major), being a double octave compounded with a major third..........



Besides these, there is a third class of intervals; viz. such as may be termed *extraneous;* the distinguishing characteristic of which is, that, as far as the major mode is concerned, they are *foreign to the scale,* consisting of combinations not to be found there. Some of them indeed are foreign to the scale in the minor mode also.

The extraneous intervals are—

1. *The Enharmonic Interval**.

This is the least interval recognised in music, and is that which exists between two contiguous notes,—the lower one marked ♯, and the upper, ♭; for example, between G♯ and A♭. But in instruments with fixed keys (as they are called), where the sound of every note is absolutely fixed, and which are consequently tuned by *temperament* (as to which, vide post, Chap. IV), this interval has in fact no existence, the same sound serving to express the sharp of the lower and the flat of the upper note; though the distinction between these is nevertheless of importance, and is still preserved in point of notation.

---

* Sometimes called (though incorrectly) a *Quartertone.*

2. *The Chromatic (or Minor) semitone.*

This is the interval which exists between any note in the scale, and the same note raised by a ♯ or lowered by a ♭; for example, the interval or difference between G and G♯, or between E and E♭; differing in this respect from the semitone *of the scale** (called, by way of distinction from it, the *diatonic* semitone)†, which is an interval between different notes of the scale, viz. between the 3rd and 4th, or between the 7th and 8th; for example, between E and F, or between B and C, in the key of C major ‡; and which is also a somewhat larger interval than the *chromatic* semitone; though, in instruments with fixed keys, these intervals are equalized by *temperament*, in the tuning.

3. *Certain of the proper intervals of the scale, either augmented or diminished by a chromatic semitone; and often described as Altered intervals.*

As when the tone C D is augmented into C D ♯ by the addition of the chromatic semitone from D to D ♯; or when the minor 7th, G F, is diminished into G ♯ F by the subtraction of the *chromatic* semitone from G to G ♯.

Of these three kinds of extraneous intervals§, examples are set forth in the following Table, which comprises all the chief intervals of that class‖.

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* Vide sup. p. 2.

† See Appendix, Note (N).

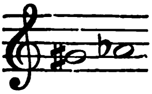
‡ Vide sup. p. 3.

§ See Appendix, Note (O).

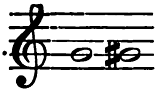
‖ See Appendix, Note (P).

TABLE OF EXTRANEOUS INTERVALS.

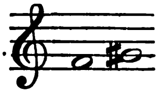
An *enharmonic interval*..........



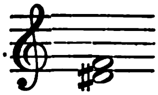
A *chromatic semitone*..........



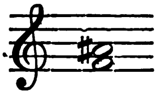
An *augmented 2nd*..........



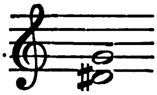
A *diminished minor 3rd*..........



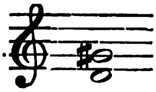
An *augmented major 3rd*..........



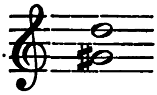
A *diminished 4th*..........



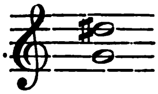
An *augmented 4th*..........



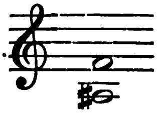
A *diminished 5th*..........

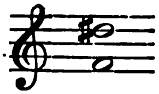


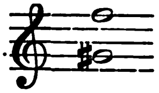
An *augmented 5th*..........



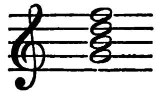
A *diminished minor 6th*..........



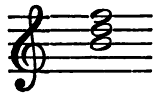
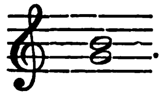
An *augmented major* 6*th* (*or extreme sharp* 6*th*). .. 

A *diminished minor* 7*th*............................... 

Though a chord has been correctly above defined as a combination of any number of notes struck together, yet, in its most usual sense, it consists of four notes (or three intervals),

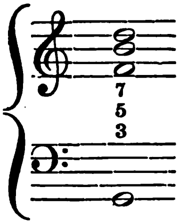
thus 

It often consists, however, of fewer notes, viz. of three,

thus : or of two only, thus . But a chord of only two notes (or one interval) is usually described, not as a chord, but as an interval, or (specifically) as a 3rd, 5th, &c. according to the nature of the interval.

When a chord consists of more than four notes, the additional sounds are usually mere octaves or repetitions of some of the others; so that the sounds are in effect but four. There are instances, however, of chords which contain more than four distinct sounds.

The intervals of a chord are (in the ordinary course) counted upwards, from the *bass* (or *lowest*) note, and it takes its denomination from the nature of its intervals so counted. Thus, if a chord contain the notes G, F, B, D, its intervals counted from the bass note (suppose G) are G F, G B, G D, which are a minor 7th, a major 3rd, and a fifth; and it is consequently called a chord of the seventh, fifth, and third, or (more shortly) a chord of the seventh; and, where the chords are distinguished by figures (as in treatises is usually the case), is figured $\begin{smallmatrix}7\\5\\3\end{smallmatrix}$[*], or 7, thus:



If the order of the notes of any chord be so changed as to involve a change of the bass note, its intervals and denomination will be changed. Thus, if the chord G F B D be changed in the order of its notes, by making B the bass note, and turned into B D F G, its intervals, counted from the bass note, will now be B D, B F, B G, which are a minor 3rd, a minor 5th, and a minor 6th, instead of a minor 7th, a major 3rd, and a 5th; and its denomination will be a chord of the sixth, fifth, and third, or a chord of $\begin{smallmatrix}6\\5\\3\end{smallmatrix}$, or $\begin{smallmatrix}6\\5\end{smallmatrix}$.

On the other hand, if the order of the notes be changed *without* changing the bass note, the intervals and denomination will remain the same as before. Thus, if the chord G F B D be changed into G B D F, the intervals, counted from the bass note, will be G B, G D, G F, which are the same as those of the original chord, G F B D (viz. G F, G B, G D); and its denomination will still be a chord of the seventh, fifth and third, or a chord of $\begin{smallmatrix}7\\5\\3\end{smallmatrix}$, or 7. In the first case, viz. that of a change in the bass note, the chord thereby produced is called an *inversion* of the original (or *direct*) one; and is considered, for most purposes, as a different chord, because the intervals are altered; but in the second, where the new arrangement involves no change in the bass note, or in the intervals, the chord produced is called a *new position* of the original one, and is considered as substantially the same chord. In either case, however, it will be observed, that there is so far an identity between the new chord and the original one, that both consist of exactly the same notes.

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[*] In figuring chords, the usual way is to put the larger interval always uppermost, in whatever order the intervals, as counted from the bass, may actually lie. Thus the chord is here figured $\begin{smallmatrix}7\\5\\3\end{smallmatrix}$, though its intervals are actually in the order $\begin{smallmatrix}5\\3\\7\end{smallmatrix}$.

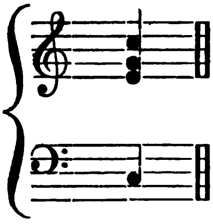
These explanations are in part also applicable to the case of mere *intervals* as distinguished from *chords*. Thus, if an interval contains the notes B F (B being the bass note), it is an interval of B F, which is a minor 5th; but if the bass note be changed to F, we have the interval F B, which is a tritone, and an *inversion* of the minor 5th.

The particular chords to which we shall invite the reader's attention, will now follow. Their selection and arrangement are, in a great measure, peculiar to the present work.

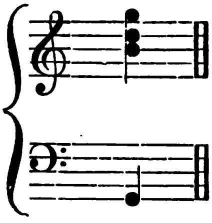
I. The *Common Chord Major* (or simply the *Common Chord*)*.

In the major mode, to which, from its greater frequency and importance, we shall always hereafter confine ourselves, except in some few instances, when the minor is expressly referred to, the common chord major may be taken upon (that is, may have for its bass note), the tonic, the dominant, or the subdominant, of the key†. It consists of the intervals of an 8th, a 5th, and a major 3rd ‡; and the following are examples:

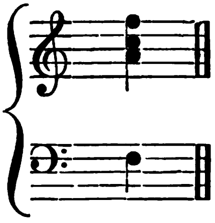
Common Chord Major on the tonic.



Common Chord Major on the dominant.



Common Chord Major on the subdominant.



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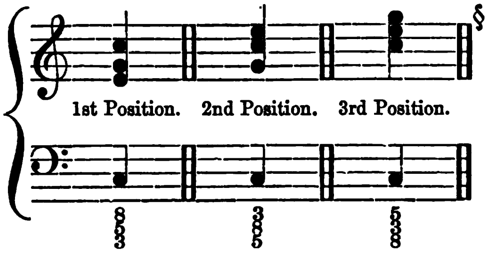
* See Appendix, Note (Q).

† As to these terms, v. sup. p. 22.

‡ Though the intervals of the common chord major are an 8th, a 5th,

When figured, it is marked $\begin{smallmatrix}8\\5\\3\end{smallmatrix}$, or $\begin{smallmatrix}5\\3\end{smallmatrix}$[*].

In the case of this important chord[†], it may also be useful to give examples of its different *positions*[‡]. These are three, according as the 8th, 3rd, or 5th, is uppermost; and an example of them, where the common chord is on the tonic, may be given as follows:



II. The 1*st Inversion* [||] *of the Common Chord Major.*

This is taken upon the note which forms the interval of major 3rd in the common chord major, whether that chord is taken on the tonic, the subdominant, or the dominant; and it consists of

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and a major 3rd, it is to be observed that the intervals of it in these examples are, properly speaking, a 15th, 12th, and 10th; and it is true not only as to this chord, but all the others in our examples, that their intervals, though *compound*, are mentioned in this way, according to the common practice in music, as if they were *simple*.

[*] Even when the chords in general are figured, the figuring of the common chord (major or minor) is, on account of its frequency, most usually omitted, unless it is wished to call attention to it, as compared with the figuring of the other chords.

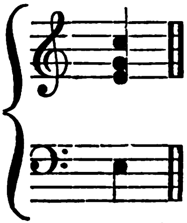
[†] See Appendix, Note (R).

[‡] As to *positions* of chords, v. sup. p. 31.

[§] See Appendix, Note (S).

[||] As to *inversions* of chords, vide sup. p. 30, and see Appendix, Note (T).

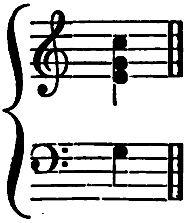
the intervals of an 8th*, a minor 6th, and a minor 3rd. The following is an example of the 1st inversion of the common chord major on the tonic:



When figured, it is sometimes marked $\substack{8\\6\\3}$ or $\substack{8\\6}$ but more usually 6†.

III. The *2nd Inversion of the Common Chord Major.*

This is taken upon the note which forms the interval of 5th in the common chord major, whether that chord is taken on the tonic, the subdominant, or the dominant; and it consists of the intervals of an 8th, a major 6th, and a 4th. The following is an example of the 2nd inversion of the common chord major on the tonic:



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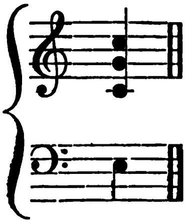
[*] The 8th, however, is in this chord most usually omitted, and to make four notes, the minor 6th, or minor 3rd is employed twice, as in the following example, when the minor 6th is so employed.



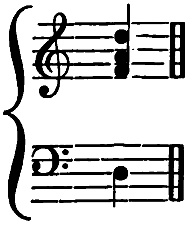
[†] It is usually denominated a *chord of the 6th*, a term applied also to No. V, post, p. 34, and to No. VIII, post, p. 35.

When figured, it is sometimes marked $\begin{smallmatrix}8\\6\\4\end{smallmatrix}$, but more usually $\begin{smallmatrix}6\\4\end{smallmatrix}$.

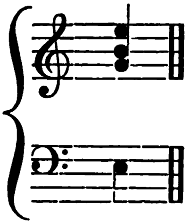
IV. The *Common Chord Minor*.

This may be taken upon the 2nd, 3rd, or 6th of the key. It consists of the intervals of an 8th, a 5th, and a minor 3rd. The following are examples :

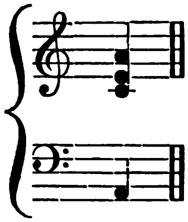
Common Chord Minor on the 2nd.



Common Chord Minor on the 3rd.



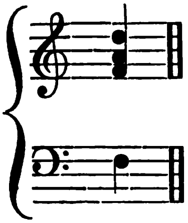
Common Chord Minor on the 6th.



When figured, it is marked $\begin{smallmatrix}8\\5\\3\end{smallmatrix}$ or $\begin{smallmatrix}5\\3\end{smallmatrix}$*.

V. The 1*st Inversion of the Common Chord Minor*.

This is taken upon the note which forms the interval of minor 3rd in the common chord minor, whether that chord is taken on the 2nd, the 3rd, or the 6th of the key ; and it consists of the intervals of an 8th, a major 6th, and a major 3rd. The following is an example of the 1st inversion of the common chord minor on the 2nd :



When figured, it is marked $\begin{smallmatrix}8\\6\\3\end{smallmatrix}$ or $\begin{smallmatrix}8\\6\end{smallmatrix}$, but more usually 6†.

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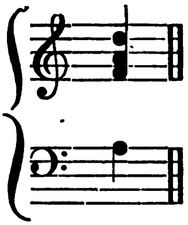
* See Appendix, Note (U).

† See Appendix, Note (V).

VI. The *2nd Inversion of the Common Chord Minor.*

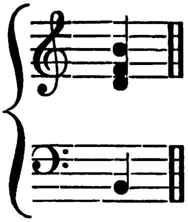
This is taken upon the note which forms the interval of 5th in the common chord minor, whether that chord is taken on the 2nd, the 3rd, or the 6th of the key, and it consists of the intervals of an 8th, a minor 6th, and a 4th. The following is an example of the 2nd inversion of the common chord minor on the 2nd:



When figured, it is sometimes marked $\begin{smallmatrix}8\\6\\4\end{smallmatrix}$, but more usually $\begin{smallmatrix}6\\4\end{smallmatrix}$.

VII. The *Imperfect Common Chord**.

This is taken upon the leading note of the key. It consists of the intervals of an 8th, a minor 5th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}8\\5\\3\end{smallmatrix}$ or $\begin{smallmatrix}5\\3\end{smallmatrix}$.

VIII. The 1*st Inversion of the Imperfect Common Chord.*

This is taken upon the note which forms the interval of minor

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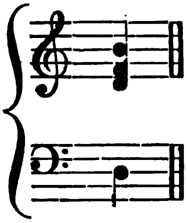
* See Appendix, Note (W).

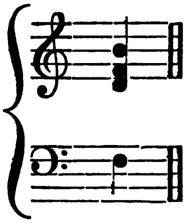
3rd in the imperfect common chord, and it consists of the intervals of an 8th, a major 6th, and a minor 3rd. The following is an example:



When figured, it is marked sometimes $\begin{smallmatrix}8\\6\\3\end{smallmatrix}$ or $\begin{smallmatrix}8\\3\end{smallmatrix}$, but more usually 6.

IX. The *2nd Inversion of the Imperfect Common Chord.*

This is taken upon the note which forms the interval of 5th in the imperfect common chord, and it consists of the intervals of an 8th, a major 6th, and a tritone. The following is an example:



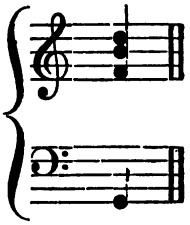
When figured, it is marked sometimes $\begin{smallmatrix}8\\6\\4\end{smallmatrix}$, but more usually, $\begin{smallmatrix}6\\4\end{smallmatrix}$.

The chords hitherto noticed are all chords (it will be observed) with the intervals of *8th, 5th,* and *3rd* (major or minor), or their respective inversions; which chords of 8th, 5th, and 3rd, as occurring in any key, are also called the *common chords major, minor,* and *imperfect,* of that key.

We have next to advert to chords with the intervals of *7th,* *5th, and 3rd* (major or minor), called *chords of the 7th**, with their respective inversions. It will be sufficient for the present purpose to particularize only three of these chords of the 7th; viz. those which are taken upon the dominant, the 2nd, and the leading note, respectively, together with their inversions. These chords and inversions are as follows.

X. The *Chord of the Dominant Seventh.*

This being taken upon the dominant, derives from thence its name. It consists of a minor 7th, a 5th, and a major 3rd†; and the following is an example:



When figured, it is marked $\begin{smallmatrix}7\\5\\3\end{smallmatrix}$, $\begin{smallmatrix}7\\5\end{smallmatrix}$, or 7‡.

As we gave the *positions* of the common chord major, the principal concord, so we will now give those of the dominant 7th,

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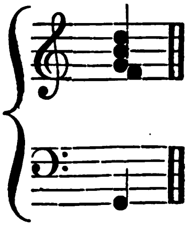
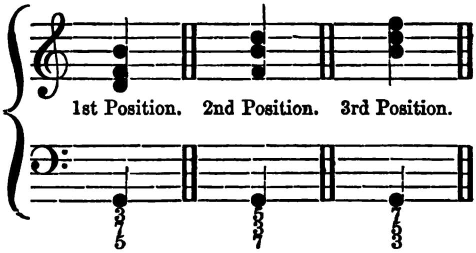
* In some works, the term *chord of the 7th* is applied to any chord with the interval of a 7th, whatever may be the *other* intervals with which it is combined. But there is a convenience in confining the term to chords of 7th, 5th, and 3rd.

† To the chord of the dominant 7th, an 8th is very frequently added; of which the following is an example.



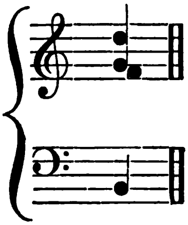
See Appendix, Note (X).

the principal discord. They are three, according as the 3rd, 5th, or 7th, is uppermost; and are as follows:



XI. The 1*st Inversion of the Chord of the Dominant 7th.*

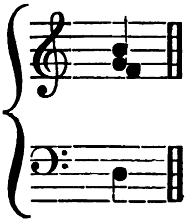
This is taken upon the note which forms the interval of major 3rd in the chord of the dominant 7th, and it consists of the intervals of a minor 6th, a minor 5th, and a minor 3rd.



When figured, it is marked $\begin{smallmatrix}6\\5\\3\end{smallmatrix}$, or more usually, $\begin{smallmatrix}6\\5\end{smallmatrix}$.

XII. The *2nd Inversion of the Dominant 7th.*

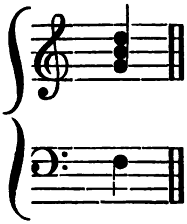
This is taken upon the note which forms the interval of 5th in the chord of the dominant 7th, and it consists of the intervals of a major 6th, a 4th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{matrix}6\\4\\3\end{matrix}$ or $\begin{matrix}4\\3\end{matrix}$.

XIII. The *3rd Inversion of the Chord of the Dominant 7th.*

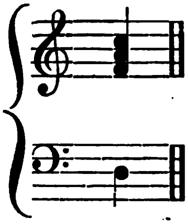
This is taken on the note which forms the interval of 7th in the chord of the dominant 7th, and it consists of the intervals of a major 6th, a tritone, and a 2nd. The following is an example:



When figured, it is marked $\begin{matrix}6\\4\\2\end{matrix}$, $\begin{matrix}4\\2\end{matrix}$, or 2*.

XIV. The *Chord of the 7th upon the 2nd of the key.*

This is taken upon the 2nd of the key, and it consists of the intervals of a minor 7th, a 5th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{matrix}7\\5\\3\end{matrix}$, $\begin{matrix}7\\5\end{matrix}$, or 7.

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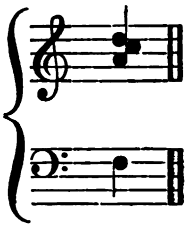
* See Appendix, Note (Y).

XV. The 1*st Inversion of the Chord of the 7th upon the 2nd of the key.*

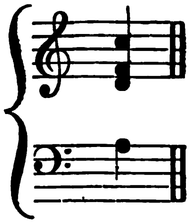
This is taken upon the note which forms the interval of minor 3rd in this chord of the 7th, and it consists of the intervals of a major 6th, a 5th, and a major 3rd. The following is an example :



When figured, it is marked $\begin{smallmatrix}6\\5,\\3\end{smallmatrix}$ or more usually $\begin{smallmatrix}6\\5\end{smallmatrix}$.

XVI. The 2*nd Inversion of the Chord of the 7th upon the 2nd of the key.*

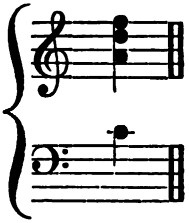
This is taken upon the note which forms the interval of 5th in this chord of the 7th, and it consists of the intervals of a minor 6th, a 4th, and a minor 3rd. The following is an example :



When figured, it is marked $\begin{smallmatrix}6\\4,\\3\end{smallmatrix}$ or $\begin{smallmatrix}4\\3\end{smallmatrix}$.

XVII. The *3rd Inversion of the Chord of the 7th upon the 2nd of the key.*

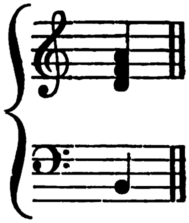
This is taken upon the note which forms the interval of 7th in this chord of the 7th, and it consists of the intervals of a major 6th, a 4th, and a 2nd. The following is an example:



When figured, it is marked $\begin{smallmatrix}6\\4\\2\end{smallmatrix}$, $\begin{smallmatrix}4\\2\end{smallmatrix}$, or 2.

XVIII. The *Chord of the 7th upon the leading note.*

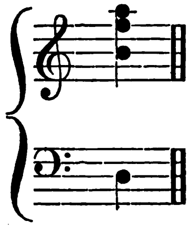
This is taken upon the leading note of the key, and it consists of a minor 7th, a minor 5th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}7\\5\\3\end{smallmatrix}$, $\begin{smallmatrix}7\\5\end{smallmatrix}$, or 7.

XIX. The 1*st Inversion of the Chord of the 7th upon the leading note.*

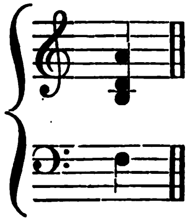
This is taken upon the note which forms the interval of minor 3rd in this chord of the 7th, and it consists of the intervals of a major 6th, a 5th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{matrix}6\\5\\3\end{matrix}$, or $\begin{matrix}6\\5\end{matrix}$.

XX. The 2*nd Inversion of the Chord of the 7th upon the leading note.*

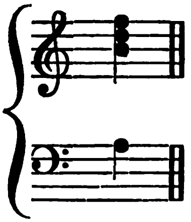
This is taken upon the note which forms the interval of 5th in this chord of the 7th, and it consists of the intervals of a major 6th, a tritone, and a major 3rd. The following is an example:



When figured, it is marked $\begin{matrix}6\\4\\3\end{matrix}$, or $\begin{matrix}4\\3\end{matrix}$.

XXI. The 3*rd Inversion of the Chord of the 7th upon the leading note.*

This is taken upon the note which forms the interval of 7th in this chord of the 7th, and it consists of the intervals of a minor 6th, a 4th, and a 2nd. The following is an example:

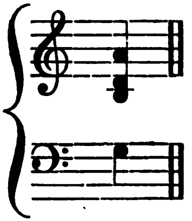


When figured, it is marked $\begin{smallmatrix}6\\4\\2\end{smallmatrix}$, $\begin{smallmatrix}4\\2\end{smallmatrix}$, or 2.

We have next to advert to chords with the intervals of *9th, 5th,* and *3rd* (major or minor), called ***chords of the 9th**** . It will be sufficient for the present purpose, to particularize only one of them, viz. the chord of the 9th upon the dominant; which is as follows:

XXII. The *Chord of the Dominant 9th.*

This being taken upon the dominant, derives from thence its name; and we may remark of it that it is far the most important of the chords of the 9th. It consists of the intervals of a major 9th, a 5th, and a major 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}9\\5\end{smallmatrix}$, or 9.

We have next to notice chords which, though, like the former, consisting of intervals belonging to the scale, yet comprise no combination of the intervals of 8th, 5th, and 3rd, or 7th, 5th, and 3rd, or 9th, 5th, and 3rd. Their intervals will, in general, be major or minor, according to the note of the key on which they are taken. The following are some of the most important:

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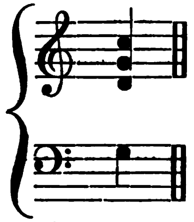
* In some works, the term, chord of the 9th, is applied to any chord with the interval of a 9th, whatever may be its other intervals. But there is a convenience in confining the terms to chords of the 9th, 5th, and 3rd.

XXIII. The *Chord of* $\begin{smallmatrix}8\\5\\4\end{smallmatrix}$.

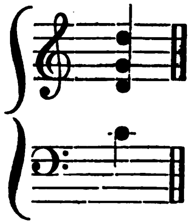
This chord, when taken upon the dominant, consists of the intervals of an 8th, a 5th, and a 4th. The following is an example:



When figured, it is marked $\begin{smallmatrix}8\\5\\4\end{smallmatrix}$, $\begin{smallmatrix}4\\5\end{smallmatrix}$, or 4 *.

XXIV. The *Chord of* $\begin{smallmatrix}5\\2\end{smallmatrix}$.

This chord, when taken on the tonic, consists of the intervals of a 5th and a 2nd. To make 4 notes, the 2nd or 5th may be employed twice; as in the following example:



XXV. The *Chord of* $\begin{smallmatrix}5\\4\\2\end{smallmatrix}$.

This chord, when taken on the tonic, consists of the intervals of a 5th, a 4th, and a 2nd. The following is an example:

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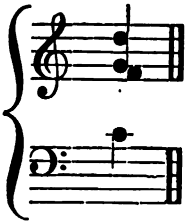
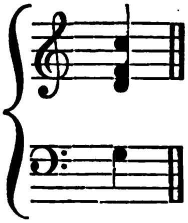
* See Appendix, Note (Z).



When figured, it is marked $\begin{smallmatrix}5\\4\\2\end{smallmatrix}$.

XXVI. The *Chord of* $\begin{smallmatrix}7\\5\\4\end{smallmatrix}$.

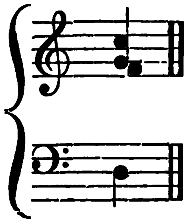
This chord, when taken on the dominant, consists of the intervals of a minor 7th, a 5th, and a 4th. The following is an example:



When figured, it is marked $\begin{smallmatrix}7\\5\\4\end{smallmatrix}$.

XXVII. The *Chord of* $\begin{smallmatrix}7\\4\\3\end{smallmatrix}$.

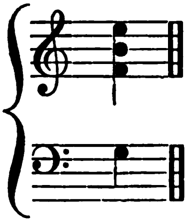
This chord, when taken on the 2nd of the key, consists of the intervals of a minor 7th, a 4th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}7\\4\\3\end{smallmatrix}$.

XXVIII. The *Chord of* $\begin{smallmatrix}7\\6\\3\end{smallmatrix}$.

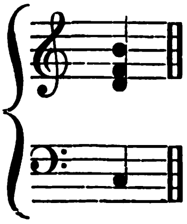
This chord, when taken on the dominant, consists of the intervals of a minor 7th, a major 6th, and a major 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}7\\6\\3\end{smallmatrix}$.

XXIX. The *Chord of* $\begin{smallmatrix}7\\4\\2\end{smallmatrix}$.

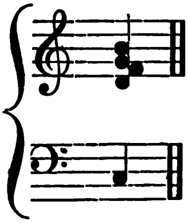
This chord, when taken on the tonic, consists of the intervals of a major 7th, 4th, and 2nd. The following is an example:



When figured, it is marked $\begin{smallmatrix}7\\4\\2\end{smallmatrix}$.

XXX. The *Chord of* $\begin{matrix}7\\5\\4\\2\end{matrix}$.

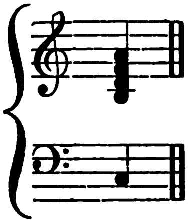
This chord, when taken on the tonic, consists of the intervals of a major 7th, a 5th, a 4th, and a 2nd*.



When figured, it is marked $\begin{matrix}7\\5\\4\\2\end{matrix}$.

XXXI. The *Chord of* $\begin{matrix}7\\6\\4\\2\end{matrix}$.

This chord, when taken on the tonic, consists of the intervals of a major 7th, a major 6th, a 4th, and a 2nd†. The following is an example:



When figured, it is marked $\begin{matrix}7\\6\\4\\2\end{matrix}$.

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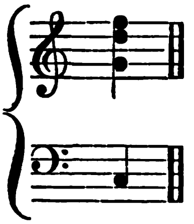
* It is sometimes called a chord of the 11th (Shield's Harmony, p. 60).

† It is sometimes called a chord of the 13th (Ibid.).

XXXII. The *Chord of* $\begin{smallmatrix}9\\5\\4\end{smallmatrix}$.

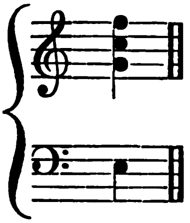
This chord, when taken on the tonic, consists of the intervals of a major 9th, a 5th, and a 4th. The following is an example:



When figured, it is marked $\begin{smallmatrix}9\\5\\4\end{smallmatrix}$.

XXXIII. The *Chord of* $\begin{smallmatrix}9\\6\\3\end{smallmatrix}$.

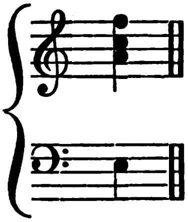
This chord, when taken on the 3rd of the key, consists of the intervals of a minor 9th, a minor 6th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}9\\6\\3\end{smallmatrix}$.

XXXIV. The *Chord of* $\begin{smallmatrix}9\\6\\4\end{smallmatrix}$.

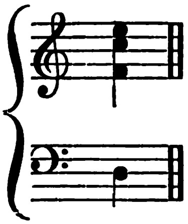
This chord, when taken on the 3rd of the key, consists of the intervals of a minor 9th, a minor 6th, and a 4th. The following is an example:



When figured, it is marked $\begin{smallmatrix}9\\6\\4\end{smallmatrix}$.

XXXV. The *Chord of* $\begin{smallmatrix}9\\7\\3\end{smallmatrix}$.

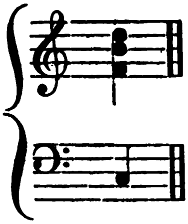
This chord, when taken on the 2nd of the key, consists of the intervals of a major 9th, a minor 7th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}9\\7\\3\end{smallmatrix}$.

XXXVI. The *Chord of* $\begin{smallmatrix}9\\7\\4\end{smallmatrix}$.

This chord, when taken on the tonic, consists of the intervals of a major 9th, a major 7th, and a 4th. The following is an example:

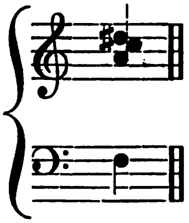


9
When figured, it is marked 7.
4

We have lastly to notice chords of a different nature from any of the preceding, being distinguished by containing among their intervals some that are not belonging to the scale, but are of the *extraneous* class*. We shall specifically mention two of them, which are as follows :—

XXXVII. The *Chord of the Extreme Sharp 6th*†.

This is taken on the note which forms the 3rd (descending) of some key in the *minor* mode‡ ; and has always the altered interval of an augmented major 6th; to which may be added the intervals of a major 3rd, and a 5th§. The following is an example: where the chord is taken on the note which is the 3rd (descending) of A minor.



When figured, it is marked 6

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* Vide sup. p. 26—28.

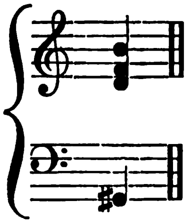
† This is otherwise called the chord of the *augmented* 6th, or of the *superfluous* 6th.

‡ See Appendix, Note (AA).

§ This chord frequently consists of an augmented major 6th, and major 3rd, *without* a 5th. In which case, if 4 notes are wanted, the note which forms the major 3rd, or the bass note, may be inserted twice (at different octaves).

XXXVIII. The *Chord of the Diminished 7th.*

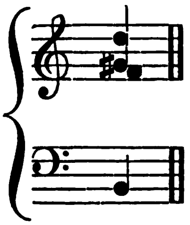
This is taken upon the leading note of some key in the *minor* mode. It consists of the intervals of a diminished minor 7th, a diminished 5th, and a minor 3rd*; and the following is an example of it, when the chord is taken upon the leading note of A minor:



When figured, it is marked 7.

XXXIX. The 1*st Inversion of the Chord of the Diminished 7th.*

This is taken upon the note which forms the interval of minor 3rd in the chord of the diminished 7th; and it consists of the intervals of a major 6th†, a minor 5th, and a minor 3rd. The following is an example:



When figured, it is marked $\substack{6\\5}$.

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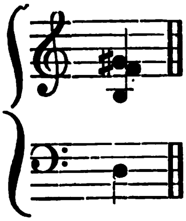
* This might be called a diminished major 3rd; but a diminished major 3rd is equivalent to that interval of the scale called a minor 3rd; which last, therefore, is its only proper designation.

† This might be called an augmented minor 6th; but an augmented minor 6th is equivalent to a major 6th.

XL. The *2nd Inversion of the Chord of the Diminished 7th.*

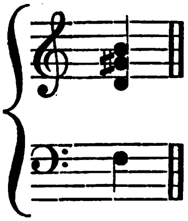
This is taken upon the note which forms the interval of diminished 5th in the chord of the diminished 7th; and it consists of the intervals of a major 6th, an augmented 4th, and a minor 3rd. The following is an example:



When figured, it is marked $\begin{smallmatrix}6\\4\\3\end{smallmatrix}$.

XLI. The *3rd Inversion of the Chord of the Diminished 7th.*

This is taken upon the note which forms the interval of diminished 7th in the chord of the diminished 7th; and it consists of the intervals of a major 6th, a tritone, and an augmented 2nd. The following is an example:



When figured, it is marked $\begin{smallmatrix}6^{*}\\4\\2\end{smallmatrix}$.

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*As to the two preceding chords of Extreme Sharp 6th, and Diminished 7th, see Appendix, Note (B B).

After these explanations in regard to certain chords of primary importance, and the constitution of the scale in regard to them, it is now time to return to the subject of chords in general.

All chords range themselves under the different classes of *Concords and Discords;* the distinction between which will be best understood by first adverting to the case of chords with only two notes, that is, mere intervals.

Intervals, then, are said to be *concords,* when they are comprised within some common chord major or minor; and are said to be *discords,* when they are not comprised within any common chord major or minor.

According to this definition, seven of the simple intervals of the scale[*], viz. the 3rd (major and minor), the 4th, the 5th, the 6th (major and minor), and the 8th, are concords[†]; for each of them occurs in a common chord, major or minor. Thus the major 3rd, C E, the minor 3rd, E G, the 4th, G $\bar{C}$, the 5th, C G, the minor 6th, E $\bar{C}$, and the 8th, C $\bar{C}$, all occur in the common chord major, C E G $\bar{C}$; and the major 6th, G $\bar{E}$, occurs in the same chord taken in the position, C G $\bar{C}$ $\bar{E}$; but the remaining six of the simple intervals of the scale, viz. the semitone, the 2nd, the tritone, the minor 5th, and the 7th major and minor, are discords; for none of these occur in any common chord major or minor. According to the same definition too, such of the compound intervals of the scale[‡], as consist of an octave compounded with any of the class of intervals first above enumerated, are concords; and such of them as consist of an octave compounded with any of the class secondly above enumerated, are discords. Thus the 10th minor, E $\bar{G}$, which is an octave compounded with the minor 3rd, E G, is a concord; but the 9th major, C $\bar{D}$, which is an octave compounded with the 2nd, C D, a discord. And, lastly, according to the same definition, all extraneous intervals[§] are discords; for none of them is to be found in the common chord.

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[*] Vide sup. p. 23, 24.

[†] See Appendix, Note (C C).

[‡] Vide sup. p. 24—26.

[§] Vide sup. p. 26—28.

It being thus premised with respect to intervals, that they are either concords or discords (or in other words, either concordant or discordant intervals), we may now lay it down with respect to chords in the fuller sense: viz. those with *more* than two notes, that such of them as comprise none but concordant intervals are concords, and such as comprise any discordant interval are discords. Thus the entire common chord major, C E G C (as well as the several concordant intervals of which it consists), is a concord, for it has no interval that is discordant; and the chord of the 7th, G B D F (as well as the discordant intervals of the minor 7th, G F, and the minor 5th, B F, which it comprises), is a discord, being made so by these, its discordant parts; though it also comprises concordant intervals, viz. the major 3rd, G B, the fifth, G D, and the minor 3rds, B D and D F. It is to chords consisting of more than two notes that the terms of *Concords* and *Discords* are in future to be understood to apply, unless the contrary shall be expressed.

The concords all afford unqualified pleasure to the ear. The discords, on the other hand, are all attended with a sort of jarring or confusion, of which the effect is, as far as it goes, unpleasing, and by which they are generally distinguished from the concords. The discords, however, differ from each other very widely in their character. The effect of some (in which the jarring is less perceptible) is, on the whole, always pleasing; that of others (in which it is more perceptible), displeasing, except in their connection with other sounds; and that of others (in which it prevails still more decidedly), too harsh to be tolerated under any circumstances.

But the two first kinds are freely admitted into musical composition, and perform services of the utmost importance; for, by way either of *variety* or *contrast*, they afford a grateful and necessary relief to the concords, an unbroken succession of which would soon prove cloying and wearisome to the ear*.

The concords are easily enumerated; for they are no other than the common chords major and minor, and their respective inversions; to all which we have already referred in our preceding collection of chords.*

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* See Appendix, Note (D D).

The discords present, on the other hand, a wide and complicated field, which we shall not attempt to traverse throughout. But, in our preceding collection of chords, the most important of the discords (viz. all the chords there mentioned, except the common chord major and minor, and their inversions) are comprised.

We have thus endeavoured to give some account of chords in general, and of the particular chords to which the attention of the reader is chiefly invited. For the more perfect elucidation of the subject, however, it should be added that this account uniformly supposes the chords to be in their *perfect state;* but that, in fact, they very frequently (and indeed *most* frequently) appear in a *thinned* or reduced state; for any of the notes of a chord (the bass excepted)† may, in general, be omitted without essential alteration of its character. Thus the common chord may present itself in the shape of $\begin{matrix}8\\3\end{matrix}$, instead of $\begin{matrix}8\\5\\3\end{matrix}$; the 5th being omitted.

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* Vide sup. p. 31—35.

† This is an exception not usually made; but see Appendix, Note (W), before referred to.

CHAPTER III.

OF THE MANNER IN WHICH CHORDS ARE EMPLOYED TO HARMONIZE THE MELODY OF A PIECE, AND HEREIN OF CADENCES AND MODULATIONS.

In harmonizing the melody of a piece, the method, in a general point of view, is to make each note of the melody form a constituent (and usually the *uppermost*) note of some one of the chords known in music; the choice and succession of such chords being governed to a considerable extent by principles and rules which have been progressively established among the professors of the art. We shall, in this chapter, attempt to give some general account of the manner in which the chords are used in harmonizing.

The chord whose agency is beyond comparison the most frequent, is the *common chord major*, which may occur, as we have seen, in three varieties (as they may be called), that is, as taken on three different notes of the key; viz. the tonic, the dominant, and the subdominant*; but, besides these varieties of the common chord major, great use, in harmonizing a melody is made of their *inversions;* and of the varieties of the *common chord minor* (for that also has three, as it may be taken on the 2nd, 3rd, and 6th, of the key †); and of the *inversions* of these; and of *discords* direct and inverted ‡; and of chords of the same descriptions as above enumerated, but lying in some different key from that with which the piece commenced—being thrown into such different key—by the change which is technically called a *modulation*.

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* Vide sup. p. 31.

† Vide sup. p. 34.

‡ See Appendix, Note (EE).

The chords thus used in harmonizing a melody, we have already distributed into different classes, according to the combinations of intervals which they respectively contain; the first of which we designated as the *common chord major, minor, and imperfect* * (or chords with the intervals of 8th, 5th, and 3rd), with their inversions. Now it is of this class that the chief use is made, in harmony; a circumstance that will appear very natural when we consider that it is in this class exclusively, that the *concords* are to be found †, and also that this class consists almost exclusively of concords—the imperfect common chord and its inversions ‡ (which are *discords*, owing to their minor 5th, or its inversion the tritone §) being the only exceptions.

For obtaining a clearer view of this class of chords and a better comprehension of the remarks about to be made upon them, the following table will be found useful.

THE COMMON CHORDS OF THE KEY.

(In the major mode. In the key of C.)

	C̄	D̄	Ē	F̄	Ḡ	Ā	B̄
	G	A	B	C̄	D̄	Ē	F̄
	E	F	G	A	B	C̄	D̄
Fundamental Basses.	C	D	E	F	G	A	B
	Common Chord Major.	**Common Chord Minor.**	**Common Chord Minor.**	**Common Chord Major.**	**Common Chord Major.**	**Common Chord Minor.**	**Common Chord Imperfect.**

In this, the *direct* chords of the class in question (seven in number, as taken on the several notes of the key) are exhibited in vertical columns with their distinctions of major, minor, and imperfect subscribed; and it is to be observed that the notes of the key on which such chords are taken are here described not as Bass notes (or Basses), but by their more specific appellation of Fundamental Basses—the term, Fundamental Bass (or Root), being technically used in music to express the lowest note of a *direct* chord, as distinguished from the lowest note of an *inversion;* which last is denominated as a bass note, or bass, but not as a fundamental bass *.

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* Vide sup. p. 36. † Vide sup. p. 54—55.
‡ Vide sup. p. 35—36. § Vide sup. p. 53.

With this Table before us, we may in reference to the class of chords in question, remark, in the first place, that as the general object of harmonizing, is to make each note of the melody a constituent part of some chord, so it will be found that each particular note of any given melody, in any given key, is comprised in some three out of the seven direct chords of the class in question, in that key; and is, therefore, capable of being harmonized, as occasion may require, by one of these three, or one of their inversions, in whatever *position* taken. Thus to harmonize the note $\overline{C}$ in the above table (which represents the tonic, in some melody, in the key of C major) we may occasionally employ one of the different *positions* of the common chord major C E G $\overline{C}$, in the first column, or of the common chord major, F A $\overline{C}$ $\overline{F}$, in the fourth column; or of the common chord minor, A $\overline{C}$ $\overline{E}$ $\overline{A}$, in the 6th column, or of the 1st or 2nd inversion of any of these chords (formed by transferring their 3rds or 5ths to the bass), as when we turn C E G $\overline{C}$ into its 1st inversion, E E G C, or its 2nd inversion, G E G C. And so, to harmonize the note D (the 2nd of the key), we may have recourse in the same manner to one of the different *positions* of the chord in the second column, or in the fifth, or in the seventh; or of one of their inversions respectively. And the course, as to any other note in the melody, proceeds upon exactly the same principle.

The next remark that we would make upon this class of chords, is that they occur very largely in *succession;* and that there is a great difference in the frequency with which some successions of them are employed, as compared to others; and here we shall find it convenient to have recourse again to the technical term of fundamental bass; for when we wish to express a change from one common chord, as C E G $\overline{C}$, or one of its inversions (in any *position*), to another common chord, as F A $\overline{C}$ $\overline{F}$, or one of its inversions (in any *position*), we may compendiously do this by speaking simply of a change of fundamental bass from C to F. This being premised, the relative frequency of the successions in which the different chords in the table, or their inversions (in whatever *position*), are respectively employed, will be understood by the following statement; viz. that the changes of fundamental bass from the tonic to the subdominant, as from C to F, or to the dominant, as from C to G, or *vice versâ* from the subdominant or dominant, to the tonic, are extremely frequent;—that the changes of fundamental bass from the tonic to the 2nd, 3rd, 6th, or 7th, of the key—as from C to D, E, A, or B,—or, *vice versâ,* from any of these to the tonic—are much less numerous; and that the changes from any fundamental bass except the tonic, to any other except the tonic, or *vice versâ,* are somewhat less numerous than even those last mentioned.

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* See Appendix, Note (FF).

We would also remark in reference to the same class of chords, that when, in their succession, any fundamental bass (whether the tonic or any other) changes to the note which is a 3rd, 4th, 5th, or 6th, from it, counting upwards—as when C changes to E, F, G, or A—the chords, if played full, have, by the constitution of the scale, as will be manifest from the Table, either one or two notes in common*; and, by this connection, or, as the French call it, *liaison,* follow each other with smoothness or facility†; but, in the successions which involve a change of fundamental bass, to the note which is a 2nd or 7th from it, counting upwards, as when C changes to D or B, the chords have *no* note in common *; and follow each other with some degree of roughness, such successions being adopted as it would seem (like *discords*) chiefly for the sake of variety and contrast.

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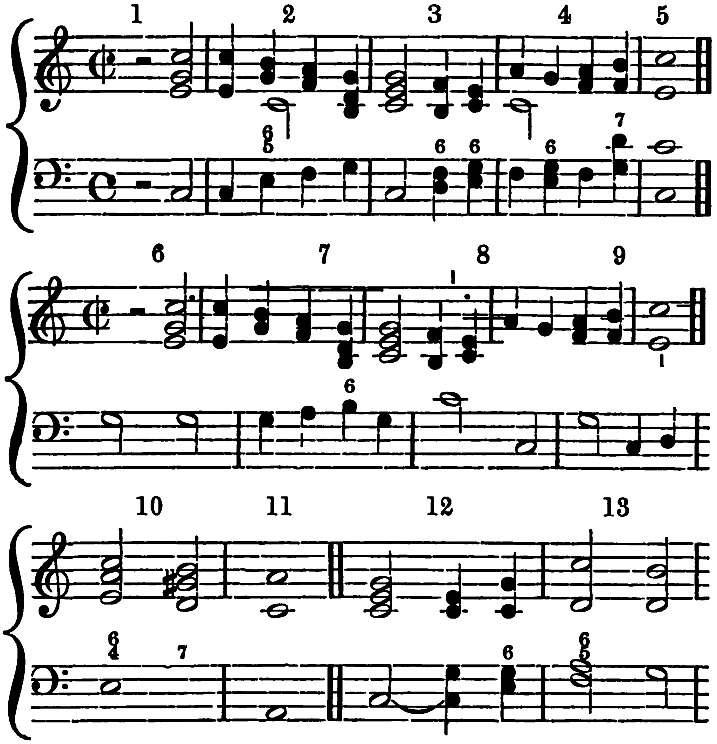
* It will be found that the 1st and 3rd columns have the two notes, E and G, in common; the 1st and 4th columns have the single note, C, in common, &c.

† It is to be observed, however, that the chords whose fundamental basses are the tonic and the dominant, or the tonic and sub-dominant, and which have only *one* note in common, follow each other with more advantage than any chords which have *two.*

We shall now give examples of the manner in which a melody is harmonized, subjoining in each case an analysis in which we shall explore the course of the harmony, and show that it involves the principles which are above stated.

PSALM TUNE.



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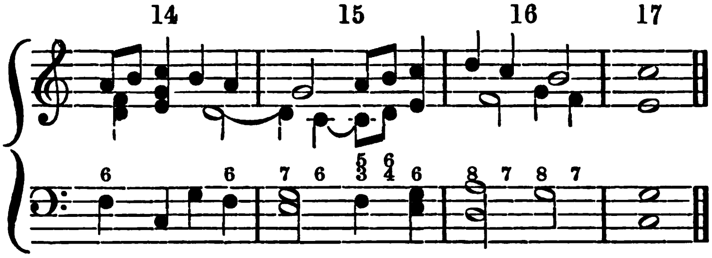
* It will be found in the Table that the 1st and 2nd columns, and the 1st and 7th, &c. have no note in common.



ANALYSIS.

First bar.

The tonic in the melody in the key of C major is harmonized by the common chord major of the tonic.

Second bar.

The same is harmonized by the same with its 5th left out.*

The leading note in the melody is harmonized by the first inversion of the discord of the 7th upon the tonic.

The sixth in the melody is harmonized by the common chord major of the subdominant.

The dominant in the melody is harmonized by the common chord major of the dominant, the fundamental bass having changed to a 2nd note †.

Third bar.

The dominant in the melody is harmonized by the common chord major of the tonic, the fundamental bass having changed to a 4th note.

The subdominant in the melody is harmonized by the first inversion of the imperfect common chord, the fundamental bass having changed to a 7th note.

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* Vide sup. p. 55.

† Here, and throughout, it is to be understood, that in stating the change of fundamental bass, the note to which it changes is counted *upwards*. Thus it has here changed from F (the fundamental bass of the common chord of the subdominant) to G (the fundamental bass of the common chord of the dominant), which, counting upwards, is a 2nd, though counting downwards, a 7th.

The third in the melody is harmonized by the first inversion of the common chord major of the tonic, the fundamental bass having changed to a 2nd note.

Fourth bar.

The sixth in the melody is harmonized by the common chord major of the subdominant with its 8th left out, the fundamental bass having changed to a 4th note.

The dominant in the melody is harmonized by the first inversion of the common chord major of the tonic, the fundamental bass having changed to a 5th note.

The sixth in the melody is harmonized by the common chord major of the subdominant with its 5th left out, the fundamental bass having changed to a 4th note.

The leading note in the melody is harmonized by the discord of the dominant seventh.

Fifth bar.

The tonic in the melody is harmonized by the common chord major of the tonic with its 5th left out.

Sixth bar.

The leading note in the melody is harmonized by the common chord major of the dominant, the fundamental bass having changed to a 5th note.

The second in the melody is harmonized by the common chord major of the dominant.

Seventh bar.

The second in the melody is harmonized by the common chord major of the dominant.

The second in the melody is harmonized by the first inversion of the common chord major of the dominant.

Eighth bar.

The third in the melody is harmonized by the common chord major of the tonic, the fundamental bass having changed to a 4th note.

The same is harmonized by the same.

Ninth bar.

The second in the melody is harmonized by the common chord major of the dominant, the fundamental bass having changed to a 5th note.

The third in the melody is harmonized by the common chord major of the tonic, the fundamental bass having changed to a 4th note.

The second in the melody is harmonized by the common chord minor of the second, the fundamental bass having changed to a 2nd note.

Tenth bar.

The tonic in the melody is harmonized by the second inversion of the common chord minor of the sixth, the fundamental bass having changed to a 5th note.

The second in the melody, in the key of A minor (into which there is a *modulation*) *, is harmonized by the discord of the dominant 7th in that key.

Eleventh bar.

The tonic in the melody in the key of A minor is harmonized by the common chord minor of the tonic in that key with its 5th left out.

Twelfth bar.

The dominant in the melody in the original key of C major (now *restored*) is harmonized by the common chord major of the tonic.

The third in the melody is harmonized by the common chord major of the tonic.

The dominant in the melody is harmonized by the 1st inversion of the common chord major of the tonic.

Thirteenth bar.

The tonic in the melody is harmonized by the first inversion of the discord of the 7th upon the 2nd.

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* Of *modulation* (as to which, vide sup p. 57), some further account will soon be given.

The leading note in the melody is harmonized by the common chord major of the dominant with its 8th left out.

Fourteenth bar.

The sixth in the melody is harmonized by the first inversion of the common chord minor of the 2nd, the fundamental bass having changed to a 5th note.

The tonic in the melody is harmonized by the common chord major of the tonic, the fundamental bass having changed to a 7th note.

The leading note in the melody is harmonized by the common chord major of the dominant with its 8th left out, the fundamental bass having changed to a 5th note.

The sixth in the melody is harmonized by the first inversion of the common chord minor of the second, the fundamental bass having changed to a 5th note.

Fifteenth bar.

The dominant in the melody is harmonized by the discord of the 7th upon the 3rd, with its 5th left out, and by the first inversion of the common chord major of the tonic.

The sixth in the melody is harmonized by the common chord major of the subdominant, with its 8th left out, the fundamental bass having changed to a 4th note.

The leading note in the melody is harmonized by the second inversion of the imperfect common chord, the fundamental bass having changed to a 4th note.

The tonic in the melody is harmonized by the first inversion of the common chord major of the tonic, the fundamental bass having changed to a 2nd note.

Sixteenth bar.

The second in the melody is harmonized by the common chord minor of the second, the fundamental bass having changed to a second note.

The tonic in the melody is harmonized by the discord of the 7th upon the second.

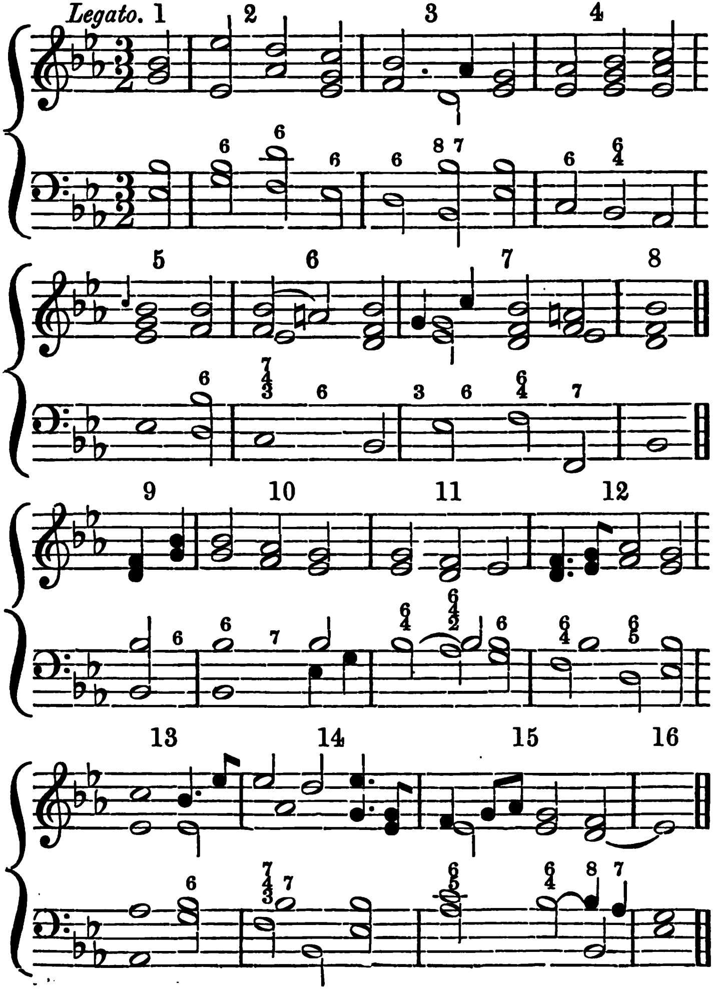
The leading note in the melody is harmonized by the common chord major of the dominant, with its 5th left out, and by the discord of the dominant 7th with its 5th left out.

Seventeenth bar.

The tonic in the melody is harmonized by the common chord major of the tonic.

PSALM TUNE.

Harrington.



ANALYSIS.

First bar.

The dominant in the melody in the key of E♭ major is harmonized by the common chord major of the tonic.

Second bar.

The tonic in the melody is harmonized by the 1st inversion of the common chord major of the tonic.

The leading note in the melody is harmonized by the 1st inversion of the imperfect common chord, the fundamental bass having changed to a 7th note.

The sixth in the melody is harmonized by the 1st inversion of the common chord minor of the sixth, the fundamental bass having changed to a 7th note.

Third bar.

The dominant in the melody is harmonized by the 1st inversion of the common chord major of the dominant, the fundamental bass having been changed to a 7th note.

The subdominant in the melody is harmonized by the discord of the dominant 7th with its 5th left out.

The third in the melody is harmonized by the common chord major of the tonic.

Fourth bar.

The subdominant in the melody is harmonized by the 1st inversion of the common chord major of the subdominant, the fundamental bass having changed to a 4th note.

The dominant in the melody is harmonized by the 2nd inversion of the common chord major of the tonic, the fundamental bass having changed to a 5th note.

The sixth in the melody is harmonized by the common chord major of the subdominant, the fundamental bass having changed to a 4th note.

Fifth bar.

The dominant in the melody is harmonized by the common chord major of the tonic, the fundamental bass having changed to a 5th note.

The same is harmonized by the 1st inversion of the common chord major of the dominant, the fundamental bass having changed to a 5th note.

Sixth bar.

The same is harmonized by the discord of $\begin{matrix}7\\4\\3\end{matrix}$ on the 6th.

The leading note in the melody in the key of B♭ (into which key there is a *modulation*) is harmonized by the 1st inversion of the imperfect common chord in that key.

The tonic in the melody in the key of B♭ is harmonized by the common chord major of the tonic in that key, the fundamental bass having changed to a 2nd note.

Seventh bar.

The sixth in the melody in the key of B♭ is harmonized by the common chord major of the subdominant of that key with its 5th left out, the fundamental bass having changed to a 4th note.

The second in the melody, in the key of B♭, is harmonized by the 1st inversion of the common chord minor of the second in that key, the fundamental bass having changed to a 6th note.

The tonic in the melody in the key of B♭ is harmonized by the 2nd inversion of the common chord major of the tonic in that key, the fundamental bass having changed to a 7th note.

The leading note in the melody in the key of B♭ is harmonized by the discord of the dominant 7th in that key, with its 5th left out.

Eighth bar.

The tonic in the melody in the key of B♭ is harmonized by the common chord major of the tonic in that key.

Ninth bar.

The dominant in the melody in the key of B♭ is harmonized by the common chord major of the tonic in that key.

The tonic in the melody in the key of B♭ is harmonized by the 1st inversion of the common chord minor of the sixth in that key, the fundamental bass having changed to a 6th note.

Tenth bar.

The same is harmonized by the same.

The subdominant in the melody in the original key of E♭ (now *restored*) is harmonized by the discord of the dominant 7th with its 3rd left out.

The third in the melody is harmonized by the common chord major of the tonic, and by its 1st inversion.

Eleventh bar.

The third in the melody is harmonized by the 2nd inversion of the common chord major of the tonic.

The second in the melody is harmonized by the 3rd inversion of the discord of the dominant 7th.

The tonic in the melody is harmonized by the 1st inversion of the common chord major of the tonic.

Twelfth bar.

The second in the melody is harmonized by the 2nd inversion of the common chord major of the dominant, the fundamental bass having changed to a 5th note.

The subdominant in the melody is harmonized by the 1st inversion of the discord of the dominant 7th.

The third in the melody is harmonized by the common chord major of the tonic.

Thirteenth bar.

The sixth in the melody is harmonized by the common chord major of the subdominant, the fundamental bass having changed to a 4th note.

The dominant in the melody is harmonized by the 1st inversion of the common chord major of the tonic, the fundamental bass having changed to a 5th note.

The tonic in the melody is harmonized by the same.

Fourteenth bar.

The same is harmonized by the discord of $\begin{smallmatrix}7\\4\\3\end{smallmatrix}$ on the second.

The leading note in the melody is harmonized by the discord of the dominant 7th with its 5th left out.

The tonic in the melody is harmonized by the common chord major of the tonic.

The 3rd in the melody is harmonized by the common chord major of the tonic.

Fifteenth bar.

The second in the melody is harmonized by the 1st inversion of the discord of the 7th on the 2nd.

The third in the melody is harmonized by the 2nd inversion of the common chord major of the tonic.

The second in the melody is harmonized by the common chord major of the dominant, and by the discord of the dominant 7th.

Sixteenth bar.

The tonic is harmonized by the common chord major of the tonic with its 5th left out.

In harmonizing a melody (of which we have, hitherto, considered only the general method), the following rules are also to be observed:—

I. *Consecutive fifths* or eighths are not allowable.*

The meaning of which is, that when two *parts* in any chord have made a 5th with each other, the same *parts* in a different chord immediately succeeding, should not again make a 5th with each other; and that when two *parts* in any chord have made an 8th with each other, the same *parts* in a different chord immediately succeeding, should not again make an 8th with each other.

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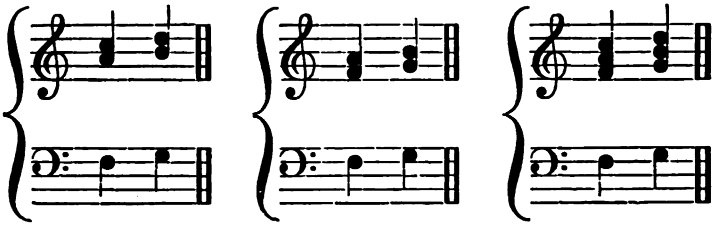
* It is to be observed that the Rule speaks of 5ths, that is, true 5ths, or 5ths properly so called. Where one of them is a *minor* 5th, the Rule does not apply.

Thus:

Ex. 1. Ex. 2. Ex. 3.



In the first example, we may observe that there is a 5th between the bass part F in the first chord, and the first part C in the same chord; and again, a 5th between the bass part G in the second chord, and the first part D in the same chord; so that we have here the objection of consecutive 5ths.

In example 2 there is an 8th between the bass part F in the first chord, and the second part F in the same chord; and again, an 8th between the bass part G in the second chord, and the second part G in the same chord; so that we have here the objection of consecutive 8ths.

In example 3 there is the double fault of consecutive 5ths (viz. F C in the first chord, and G D in the second), and consecutive 8ths (viz. F F in the first chord, and G G in the second)*.

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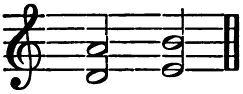
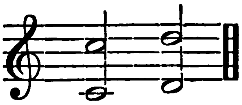
* The Rule applies not only to chords of more than two notes, but to mere *intervals*, such as the following:

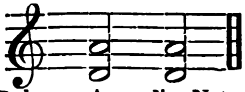
Consecutive 5ths.



Consecutive 8ths.



But it applies to no case where the second chord is not a *different* one from the first, but a mere *repetition* of it. Thus:

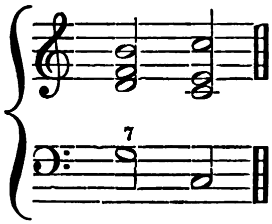


As to the *reason* of the Rule. see Appendix, Note (GG).

II. *Discords* must, in general†, be* resolved; *and in many cases, also,* prepared.

A discord is said to be resolved, when followed up, in due progression, by a concord immediately succeeding. This progression is as follows: that some (or in particular instances *all*) of the notes of the discord descend, or ascend (but most frequently descend), a semitone, or tone, as the case may be, into the concord; while occasionally there are notes as to which no change is made; and bass notes of which the descent or ascent exceeds a tone. This general description comprises many specific varieties, of some of which the following are examples:

Ex. 1.



This is a resolution of the discord of the dominant 7th‡, which is one of the more importance, on account of the frequency of that discord §. The resolution here, is into C C E C, the concord of the common chord major of the tonic ||, and it takes place by

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* The Rule applies not only to chords of more than two notes, but to mere *intervals*.

† We often find that a discord is immediately followed, not by a concord, but by some other discord or discords, antecedent to a concord; and in such a case it is only the *last* discord which is, properly speaking, resolved. Of the rest, it is usual to say that the resolution is *suspended;* but the phrase is not a satisfactory one.

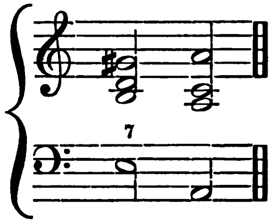
‡ As to the discord of the dominant 7th, vide sup. p. 37. When the dominant 7th has an 8th (as it often has, vide ibid. note), it resolves in the manner shewn, post, p. 80, Ex. 5.

§ The reason of its frequency, is chiefly to be found in the part which it plays in Cadences and Modulations, v. post, pp. 79, 83.

|| The 5th of this common chord (viz. G) is left out. Such omission of the 5th of the common chord is considered as necessary, where (as in the present case) that note does not appear as an 8th in the *discord.*

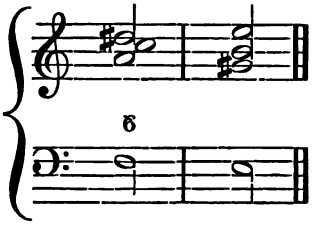
the ascent of the 3rd of the discord, B, a semitone to the upper C; the descent of the 7th*, F, a semitone to E; the descent of the 5th, D, a tone to the next C; and the descent of the bass note, G, a 5th to the bass note, C.

Ex. 2.



The preceding resolution of the dominant 7th is in the major mode, but this is in the *minor*. It is into A A C A, the common chord minor of the tonic †, in this mode‡; and it takes place by the ascent of the 3rd of the discord, G♯, a semitone to the upper A; the descent of the 7th, D, a tone to C; the descent of the 5th, B, a tone to the next A; and the descent of the bass note, E, a 5th to the bass note, A.

Ex. 3.



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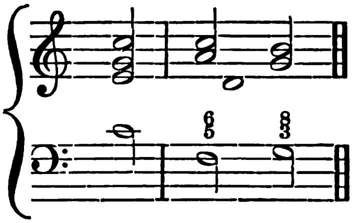
* In treating of this resolution, the 7th is often described as *the discordant note* of the discord which is resolved. But this is an incorrect expression, and has a tendency to mislead. In a discord there cannot be less than *two* discordant notes, viz. the two notes of the discordant interval which every discord in its nature comprises (vide sup. p. 53, 54). Thus, in the present case, the discord has two discordant notes, viz. G and F; these being the notes of the discordant interval, G F.

† The 5th (E) is wanting, as the 5th (G) was, in the last example, and for a similar reason. See the note there.

‡ In the minor mode, the common chord on the tonic is minor, though in the major mode, it is major.

This is a resolution of the discord of the extreme sharp 6th*. It is into E G♯ B E†, the common chord major of the dominant in the minor key; and it takes place by the ascent of the augmented 6th of the discord, D♯, a semitone to upper E; the descent of the 5th, C, a semitone to B; the descent of the 3rd, A, a semitone to G♯; and the descent of the bass note, F, a semitone to the bass note, E.

Ex. 4.



The discord here resolved is the 1st inversion of the chord of the 7th upon the 2nd of the key ‡ Its resolution is into G D G B, the concord of the common chord major of the dominant; and it takes place by the descent of the 5th of the discord, C, a semitone to B; the descent of the 3rd, A, a tone to the upper G; and the ascent of the bass note, F, a tone to the bass note, G; while the 6th, D, neither descends nor ascends, but is continued into the concord.

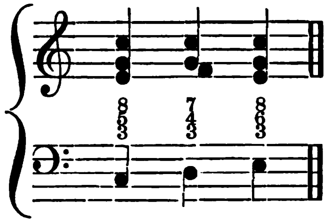
---

* As to this discord, vide sup. p. 50.

† This progression is considered by some persons as objectionable, on account of the consecutive 5ths, F C, and E B; and they consequently introduce another chord between them; but by what seems the better opinion, this case is an exception to the ordinary rule as to consecutive 5ths. See Appendix, Note (HH).

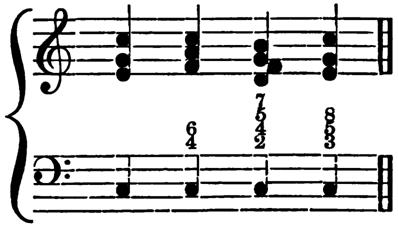
‡ As to this discord, vide sup. p. 40.

Ex. 5.



This is a resolution of the discord, $\begin{smallmatrix}7\\4\\3\end{smallmatrix}$, on the 2nd of the key*. It is into E E G C, the concord of the 1st inversion of the common chord major of the tonic†; and it takes place by the descent of the 3rd of the discord, F, a semitone to E, and the ascent of the bass note, D, a tone to E; while the 7th, C, and the 4th, G, neither ascend nor descend, but are repeated in the concord.

Ex. 6.



This is a resolution of the discord, $\begin{smallmatrix}7\\5\\4\\2\end{smallmatrix}$, on the tonic‡. It is into C E G C, the concord of the common chord major of the tonic; and it takes place by the ascent of the 7th of the discord, B, a semitone to upper C; the descent of the 4th, F, a semitone to E; and the ascent of the 2nd, D, a tone to E; while the 5th,

---

* As to this discord, vide sup. p. 45.

† As to this concord, vide sup. p. 32, 33.

‡ As to this discord, vide sup. p. 47.

G, and the bass note, C, neither descend nor ascend, but are repeated in the concord.

A discord, as appears by the Rule, must not only be resolved, but must in many instances be *prepared* also; by which we are to understand, that some discordant note (that is, some note belonging to a discordant interval)* in such discord, must have been preceded by a note of the same name, and occupying the same *part*, in the chord which went immediately before it, and must have there belonged to a *concordant* interval†. Examples of this have been anticipated in the account just given of the *resolution* of discords. Thus, in example 4, the discordant note, C, in the first part of the discord, F D A C, is preceded by C, in the first part of the previous chord, C E G C; and in that chord, the C last mentioned belongs to the several concordant intervals, C C, E C, and G C; and a similar state of things is observable in examples 5 and 6. But in examples 1, 2, and 3, it will be found, on the other hand, that *no* preparation is inserted; the dominant 7th and the extreme sharp 6th being among the discords for which preparation is not required ‡.

III. *As a general rule, a discordant note ought not to be doubled.*

By a discordant note is meant, as just stated, a note belonging to a discordant interval; and by *doubling* a note is meant the employment of it more than once, in the way of an octave in the same chord. Thus, in the chord of the dominant 7th, G F B D §, F is a discordant note, as belonging to the discordant interval G F (a 7th), or F B (a tritone), and if the F were *doubled* by turning the chord into G F B D F (or G F B F) as follows:

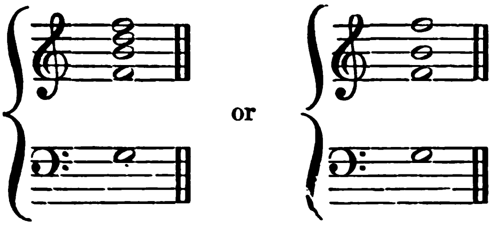
---

* As to the incorrect manner in which it is usual to speak of *discordant notes*, vide sup. p. 72, Note.

† If it belongs, however, to a concordant *interval* in the preparatory chord, that chord itself may be either a concord or a discord.

‡ See Appendix, Note (II).

§ Vide sup. p. 37.



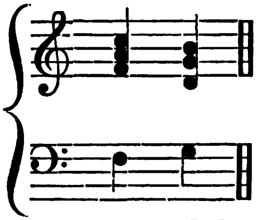
the chord would, as so altered, exemplify a violation of the Rule*. It is a Rule, however, from which the departures are numerous, particularly as regards this chord of the dominant 7th; in which, though the dominant is one of the discordant notes, it is very frequently *doubled*†.

IV. *The notes of each chord should be made, in general, to lie close to those in the same parts respectively of the chord which immediately precedes; that is, generally, at the distance of not more than the interval of a 2nd or 3rd.*

Of this, any well-composed piece with chords will afford illustration. For the present purpose we may refer specially to the two passages, sup. p. 72; where, in the treble clef, the notes of the second chord in each case are no more than a 2nd from the notes in the same parts of the first chord.

V. *In the succession of chords, the general tendency of the notes should be to take contrary motion.*

Contrary motion is where one *part* of a chord moves into the next succeeding chord by *descent*, and another *part* moves into it by *ascent*, or *vice versâ*. Thus:



where C, the first part of the first chord, descends into the second chord (as does also A, the second part, and F, the third part), —and F, the bass part, ascends into the same chord.

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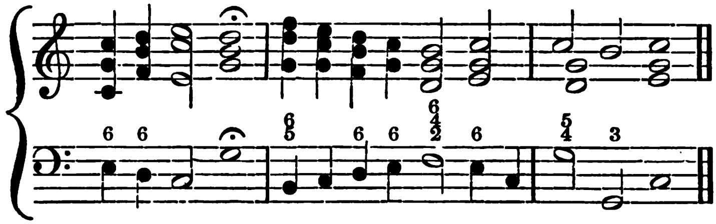
* See Appendix Note, (JJ).
† As in Ex. 5, post, p. 80.

This kind of progression has the advantage, in the first place, of being a good method to avoid the fault of consecutive 5ths or 8ths. Thus, if we recur to Ex. 3, under Rule I, p. 70, we shall find that each of these faults, as there exemplified, would have been avoided, if *contrary motion* had been given to the same notes, as in the example just presented; for though in the second chord of this example there is a 5th and an 8th, as in the first chord, they do not occupy the same *parts* as in that chord; and the case therefore does not fall within the prohibition of Rule I. But besides the advantage here pointed out, as resulting from *contrary motion*, it has that of giving variety, and point, to harmony in general. Examples are of constant occurrence; for the present purpose, the short one which follows, will suffice.



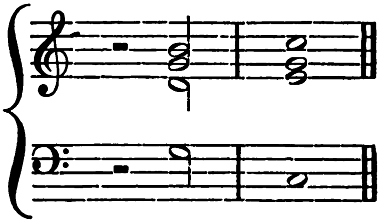
OF CADENCES.

A CADENCE is a close or termination of a course of melody or harmony. It is like a stop in writing, or a pause in speaking; and serves, in the same manner as these, to distinguish the ending of any portion or period of the piece, as well as of the whole. Our present concern is with the harmonic cadence. This properly consists of two successive chords; and it is on the latter of them that the cadence is said to *be*. But it is usually preceded by other chords of an introductory nature, and which form part of the cadence, in a more general sense of the term.

Cadences (in the major mode, to which we shall first refer) all agree in one particular, viz. that they are on the common chord, major or minor. In other respects, they are of various kinds—Full, Imperfect, or Broken.

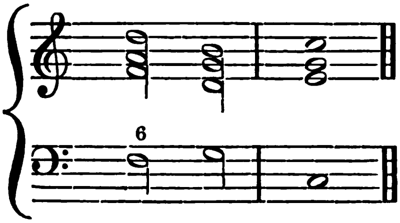
A Full cadence* is always on the common chord of the tonic; and it is the only one which is final or conclusive in its effect upon the ear, so as to leave no expectation of anything to follow. It consists regularly of an immediate progression from the common chord of the dominant, or of the dominant 7th, to the common chord of the tonic; the latter chord being in its first position†, and falling on the first accented note of the bar. The following is an example of this cadence in its most simple shape:

Ex. 1.



But it is often preceded either by the first inversion of the common chord minor upon the 2nd ‡, as in the first chord of the following example:

Ex. 2. *Burrowes.*



or by the first inversion of the chord of the 7th upon the 2nd §; as in the second chord of the following example:

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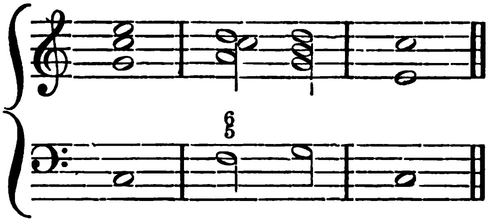
* The Full cadence is also called the *Perfect* cadence.

† As to the different *positions* of the common chord, vide sup. p. 32.

‡ This chord is sometimes called the *substituted* 6th. See Appendix, Note (KK).

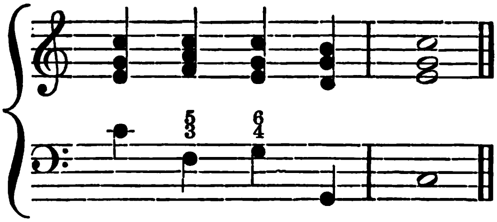
§ This chord is sometimes called the *added* 6th. See Appendix, Note (KK).

Ex. 3. *Callcott.*



A Full cadence is also further varied by introducing it with the second inversion of the common chord of the tonic, otherwise called the chord of the 6th and 4th. This species of the Full cadence, which is often denominated *the cadence with* $\substack{6\\4}$, is most usually preceded by the common chord of the subdominant; and the following is an example:

Ex. 4.



In these examples, it will be observed, the common chord of the *dominant* is employed as the penultimate chord. But in the Full cadence (whether with or without the $\substack{6\\4}$), the chord of the *dominant 7th* is most commonly used instead of the common chord of the dominant; and the cadence is thereby rendered still more complete in its effect. Examples of the Full cadence with the dominant 7th, have already occurred under the head of Resolution of Discords*. The following is another example:

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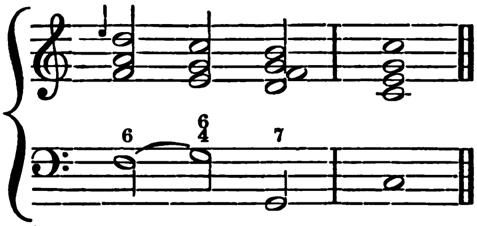
* Vide sup. pp. 71, 72.

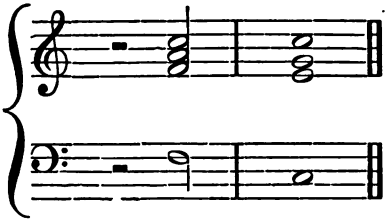
Ex. 5.



All these are to be considered as species of the Full cadence in its *regular* form. The form of the Full cadence, however, is sometimes *irregular,* deviating in one respect or another from the regular form before described, p. 78; but in whatever respect it so deviates, it is always, nevertheless, a Full cadence, if it closes on the common chord of the tonic.

There is also a somewhat rare, though not irregular, form of the Full cadence, in which, though the concluding chord is the common chord of the tonic, yet it is preceded not by the common chord of the dominant, but by that of the subdominant; and this is called, in the treatises, the *Plagal* Cadence; the Full cadence, in its usual form, being distinguished from it as the *Authentic**.

The following is an example of the Plagal cadence:



There is also the Imperfect (or Half) cadence†; which is in the inverse order of the Full cadence; the close being on the common chord of the dominant, preceded by the harmony of the tonic.

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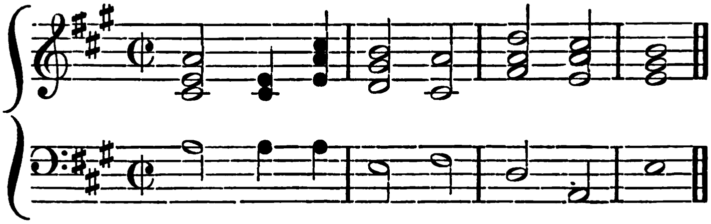
* See Appendix, Note (LL). † See Appendix, Note (MM).

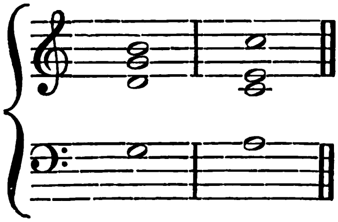
Thus:

Rogers's Hymns.



Lastly, there is the Broken (or Interrupted, or False) cadence; which is one that leads to the expectation of the regular Full cadence, but disappoints the ear, by varying unexpectedly from that cadence, in respect of the progression of the bass of the penultimate chord. For, in the regular Full cadence (as appears by the examples of it before given) *, the bass of the penultimate chord always either falls a fifth, or rises a fourth; but, in the cadence now in question, it is made to rise a tone only. Thus:

Callcott.



We have hitherto considered cadences only in reference to the *major* mode. As to cadences in the *minor* mode, they are made in the same manner as in the major, subject to exceptions, the nature of which will sufficiently appear on examination of the following examples.

The Full cadence in the minor mode, with the Common chord of the dominant as the penultimate chord, is as follows:

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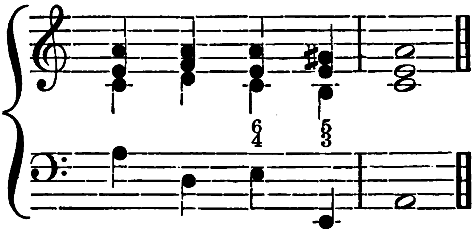
* Vide sup. p. 78—80.

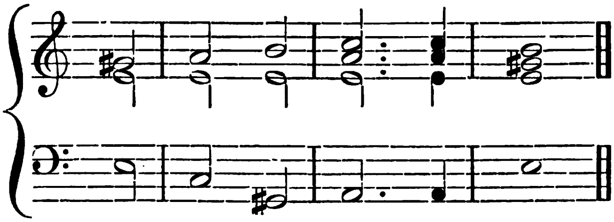
Shield.



The Full cadence in the minor mode, with the chord of the dominant 7th as the penultimate chord, has already been exhibited among the examples under the head of Resolutions of Discords*.

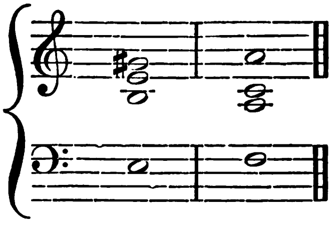
The Imperfect cadence in the minor mode is as follows:

Rev. W. Jones†.



The Broken cadence in the minor mode is as follows:

Callcott.



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* Vide sup. p. 72, Ex 2.

† The Rev. W. Jones, of Nayland, an amateur of former times.

OF MODULATION.

Modulation is a change from one key to another, in the course of the same piece of melody or harmony; such change or changes being followed always by a return to the original key. It is to harmonic modulation only, that the following observations relate.

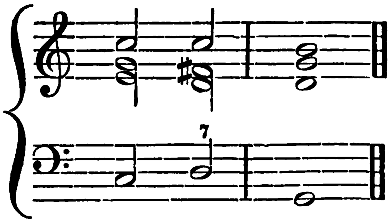
Though there is an unbounded variety as to the *particular* manner in which changes of key may be allowably effected, yet they are for the most part founded on one *general* method, viz. that of introducing the chord of the dominant 7th of the intended new key, or one of its inversions; the nature and reason of which expedient will be better understood after a few examples shall have been given.

The most simple and also the most usual modulations from any key, are into one of those to which it has the greatest propinquity; viz. into a key having altogether the same notes, though in the alternative mode, or differing only by a single note *.

The following are examples:

Ex. 1.

From C major into G major, by the dominant 7th of the new key.



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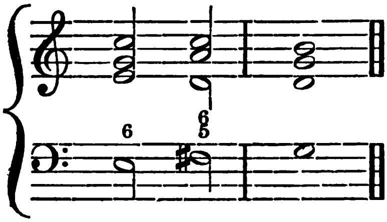
* Vide sup. p. 17.

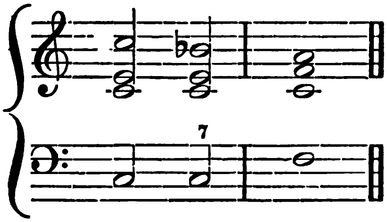
Ex. 2.

The same, by the first inversion of the dominant 7th of the new key.



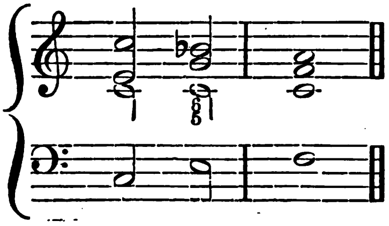
Ex. 3.

From C major into F major, by the dominant 7th of the new key.



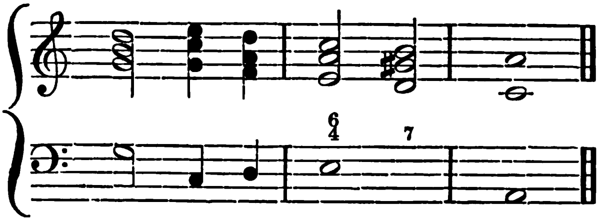
Ex. 4.

The same, by the first inversion of the dominant 7th of the new key.



Ex. 5.

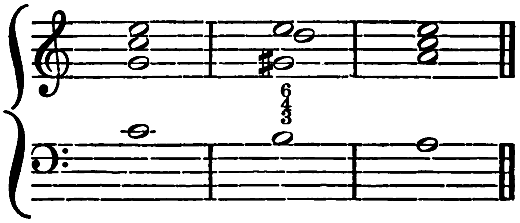
From C major into A minor, by the dominant 7th of the new key.



Ex. 6.

The same, by the second inversion of the dominant 7th of the new key.

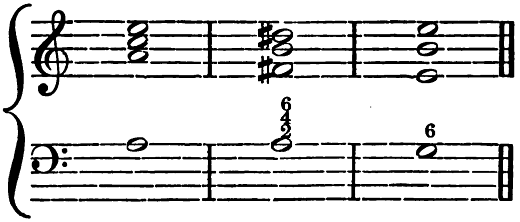
A. Reicha.



Ex. 7.

From A minor into E minor, by the third inversion of the dominant 7th of the new key.

Ibid.



These examples may be analyzed as follows:

In Ex. 1, the first chord is the common chord of C, the tonic; in the next chord, the 2nd of the key is taken for a bass, and made to bear the dominant 7th (omitting the 5th and doubling the bass note) in the key of G; and by means of this chord, the new key of G being introduced, the common chord of the tonic of that key, accordingly follows in the next bar.

In Ex. 2, the first chord is the first inversion of the common chord of the tonic, which is succeeded by the first inversion of the chord of the dominant 7th in the key of G (instead of the direct chord of the dominant 7th, as in the first example), and the key of G being thus introduced, the common chord of the tonic in G follows accordingly in the next bar.

In Ex. 3, the first chord is the common chord of the tonic C, with the 5th omitted; to which, in the next chord, a minor 7th, is added; and, by that mere addition, the harmony is turned into the chord of the dominant 7th of the key of F (with the 5th omitted); by which, the new key of F being introduced, the common chord of the tonic in that key succeeds.

In Ex. 4, the same plan of modulation is pursued, except that the first inversion of the chord of the dominant 7th of F, instead of the dominant 7th itself, is employed.

In Ex. 5, the first chord is the common chord of the dominant, in the key of C, which is followed by the common chord of the tonic, then by the common chord minor of the second, then by the second inversion of the common chord minor of the sixth, then by the chord of the dominant 7th in the key of A; which latter key being thus introduced, the harmony closes on the common chord minor of the tonic; and A in the minor mode, is thus established.

In Ex. 6, the same key of A is introduced, by the second inversion of the chord of its dominant 7th following immediately upon the common chord of the tonic in the key of C; and the close is in the minor mode as before.

In Ex. 7, the first chord is the common chord minor of the tonic, in the key of A minor, and the change to the key of E minor is effected by the third inversion of the chord of the dominant 7th of the key of E; which is followed by the first inversion of the common chord minor of its tonic.

Such, in a practical view, is the nature of modulation in its simplest form; but, in order to explain its *principle* (a subject on which the treatises are generally defective), it will be necessary to go farther.

We will first consider then, the manner in which any key is capable, in the first instance, of being established. And here we must refer to the account, given in the first chapter, of the formation of the successive keys*; from which it may be collected (and it will be further apparent on examination of the Synopsis of keys, sup. p. 15) that no two notes constituting the 4th and 7th (otherwise called the subdominant and leading note) in any key in the major mode, are both to be found in any other key in that mode; and that this is not true of any other two notes in such given key. Thus C, the subdominant, and F♯, the leading note of the key of G, are not both to be found in the scale of any other key than G; but A and B, which are both in G, are also both in C: C and D, which are both in G, are also both in C: and F♯ and B, which are both in G, are also both in D; and so of any other two notes, except only C and F♯. These notes, then, viz. the subdominant and leading note, jointly considered, are, in each key in the major mode, the *characteristic notes:* so that the occurrence of both, sufficiently establishes that key, to the exclusion of any other: and *é converso* without the occurrence of both, its establishment cannot be effected.

Again, it is the property of the chord of the dominant 7th, that (direct or inverted) it comprises the two characteristic notes above mentioned; for the minor 7th of the direct chord, is the subdominant, and its major 3rd, the leading note of the key; and both the minor 7th and the major 3rd, of course, find their proper place (under a different denomination) in each of its inversions†. Thus, in the key of G, the chord of the dominant 7th, D F♯ A C, comprises the characteristic notes of that key;

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* Vide sup. p. 6—12.

† Vide sup. pp. 37—39.

for the minor 7th, viz. C, is the subdominant, and its major 3rd, viz. F ♯, is the leading note; and so the first inversion of this dominant 7th, viz. the $^{6}_{5}$, F♯ D A C, contains, in like manner, the same characteristic notes.

It follows, from these considerations, that whenever we employ a chord which constitutes the dominant 7th in any particular key, or which constitutes any of its inversions, we are at once *in that key*. So that, for example, if we employ the chord, D F♯ A C (the dominant 7th of G), we are at once in the key of G; and if we had previously been in another key, we are, by that chord, *changing* to G, in the way of *modulation*. And we thus arrive at the reason why in modulation the introduction of the chord of the dominant 7th (direct or inverted) is in itself sufficient for the purpose. Nor is even the full chord necessary; for one or sometimes more of its notes may be left out without making the modulation less complete. Thus, in Ex. 1, sup. p. 83, D D F♯ C is effectually employed in order to modulate from the key of C into that of G; for both the characteristics of the key of G—viz. C and F♯—are retained; and so we might effectually employ for the same purpose D D F ♯ (though its employment would not in other respects be desirable); for, though, in this latter case, one of the characteristics, viz. C, is omitted, yet, as that note has been already introduced (in the chord immediately preceding), its repetition is not essential; and the employment of the other characteristic, F♯, is all that the modulation, as such, requires; the ear having sufficiently received the impression of both the characteristics. It is also material (reverting to *full* chords) to remark that, besides the chord of the dominant 7th, there are others which enable us to modulate at once, and by a single chord; that object being attainable, on the same principle as already explained, through the agency of any chord combining both the characteristic notes. Thus, it may be attained by employing the *Imperfect common chord*, or (as more commonly occurs) one of its inversions* —as in the following example:

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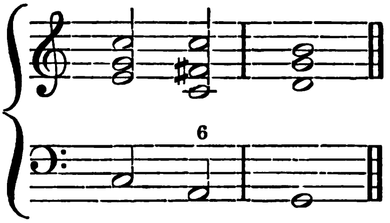
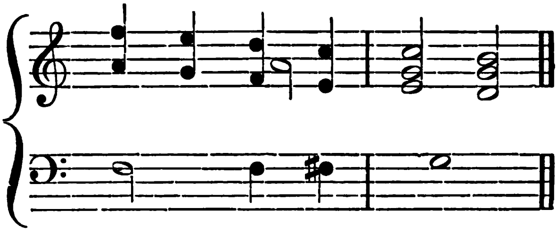
* As to these chords in the key of C, vide sup. pp. 35, 36.



where the change from the key of C to that of G is effected by A C F♯ C the first inversion of F♯ A C F♯, the imperfect common chord in the key of G; for the characteristic notes of C and F♯ are both comprised. And the case is the same with respect to the *Chord of the 7th upon the leading note,* or one of its inversions, as in the following example:



where the change from the key of C to that of G is effected by this chord of the 7th upon the leading note of the latter key; for the same characteristic notes are again comprised.

These explanations, it will be observed, relate to the *major* mode only. As to the *minor* mode, if the descending series of its scale, only, be considered, it will be found that the 3rd and 7th notes descending (which answer to the subdominant and leading note in the major)* are, like them, also, *characteristic;* for no two notes, constituting the 3rd and 7th descending in any given key in the minor mode, can both occur in the descending series of any other key in that mode †. But it is impracticable, nevertheless, to obtain, by the employment of the 3rd and 7th descending, so decisive an effect to determine the new key, as by the leading note and subdominant in the case of the major mode, owing to the necessity of taking into account the ascending as well as the descending series, which in the minor mode, as we have seen*, are different. Thus, if we are in the key of C minor, and desirous to go into the key of G minor, the employment of the 3rd with the 7th descending in G minor, viz. E♭ and A, will not in itself decisively establish that key; for E♭ and A are both also found (if we take the ascending series into account) in other keys, viz. C and B♭ minor †. There are other pairs of notes, however, which, even if the ascending as well as the descending series are taken into account, are *characteristic* in the minor mode; and these are the 3rd descending and the leading note, or the 6th descending and the leading note. Thus, if we are in the key of C minor, and desirous to go into G in the same mode, the employment of F♯, the leading note in G, with E♭, the 3rd descending, will decisively establish the key of G minor, to the exclusion of all others in that mode; for no other key in that mode comprises both F♯ and E♭ ‡. And the employment of F♯ with B♭, the 6th descending, will be equally decisive for a similar reason, no other key in the mode comprising both F♯ and B♭.

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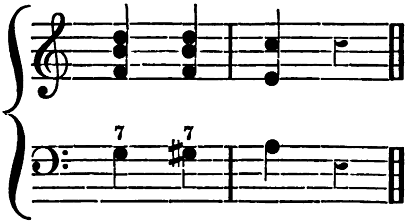
* Vide sup. p. 13.

† Vide Synopsis p. 16.

In the minor mode, therefore, it is practicable, as in the major, to modulate by a single chord; for there is a chord which comprises one of these characteristic pairs of notes; viz. the *chord of the diminished 7th* §, of which the following is an example:

Burrowes.



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* Vide sup. pp. 12, 13.

† Vide Synopsis, sup. p. 16.

‡ Vide ibid.

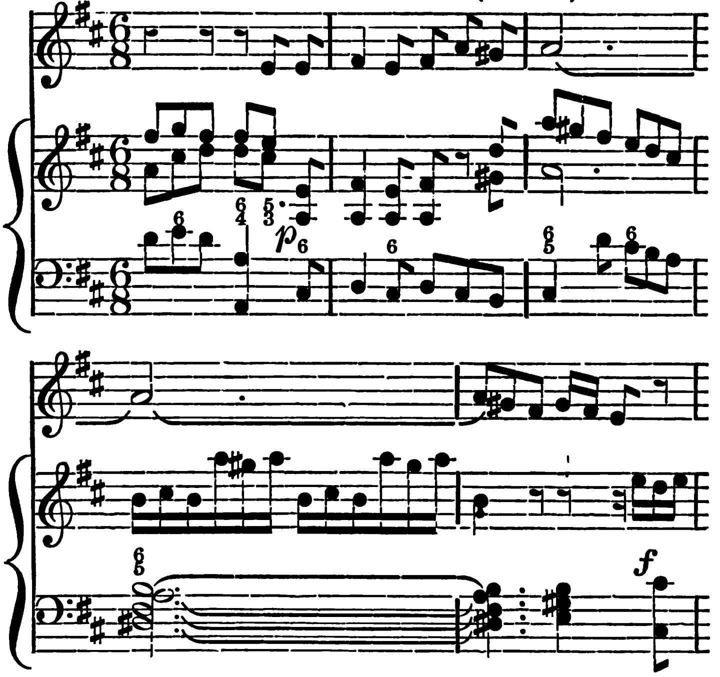
§ As to this chord, vide sup. p. 51.

where the modulation is from the key of C major into the key of A minor; which is effected by the chord of the diminished 7th, in that key (the second chord in the example); for this chord contains both the G♯ and F; which are a pair of its characteristics, viz. its leading note and its 3rd descending. It is also usual, however, in this mode as well as in the major, to resort, in modulation, to the chord of the dominant 7th or its inversions (as in the examples, sup. p. 85); for though none of these chords will in itself absolutely determine the new key, yet, if there be also introduced, in another chord, the descending 3rd or 6th of that key, it is gradually established by such note taken together with the leading note contained in the dominant 7th or its inversions; the two notes together forming a pair of characteristics. Thus, in Ex. 5, p. 85, we have a modulation from C major into A minor, by E D G♯ B, the dominant 7th of the latter key (comprising its leading note G♯), preceded (in a former chord) by the note C, which is the descending 6th of that key.

For the easier illustration of the principle of modulation, we have considered it only in its simplest form, viz. that of modulation into a key of the greatest propinquity. But modulation may also take place into a *remote* key: viz. a key differing from the original one in two or more of the notes; and here it is material to notice the following distinction. A modulation into a key of the greatest propinquity is *immediate;* by which we mean that it is effected without the previous interposition of any other key; as in all the examples above given. But a modulation into a remote key is usually *intermediate,* that is, effected by the previous interposition of some other key or keys, so arranged that each key throughout the entire series shall be in the greatest propinquity to the last preceding one. In the case indeed of a modulation into a remote key, it *cannot* in general be *immediate,* without some comparative harshness; a quality that, generally speaking, is in proportion to the degree of remoteness.

An intermediate modulation may be illustrated by the following example:

(*Messiah*) *Handel.*



in which there is a modulation from D major into E major (a remote key), and the intermediate key of A major (nearly related to both) is introduced in the 2nd bar by the chord, B G♯ D, containing the characteristic notes of A major*.

Before we conclude this chapter, it will be necessary to notice two species of progression, which, though not properly modulations, are at the same time of a similar nature.

The first is a transition from one mode to another, the tonic remaining unaltered; as from C major to C minor, or vice versâ. In such a case, as there is no change of *key*, but only of *mode*, there is no modulation, in the strict meaning of that term; but the effect is very similar to that of a modulation; though a change from the major to the minor mode, when it is of this description, is more marked and emphatic than when it takes place by way of modulation into the *relative* minor†, as in Examples 5 and 6, sup. p. 85. The following is a transition of the kind above mentioned, from C major into C minor.

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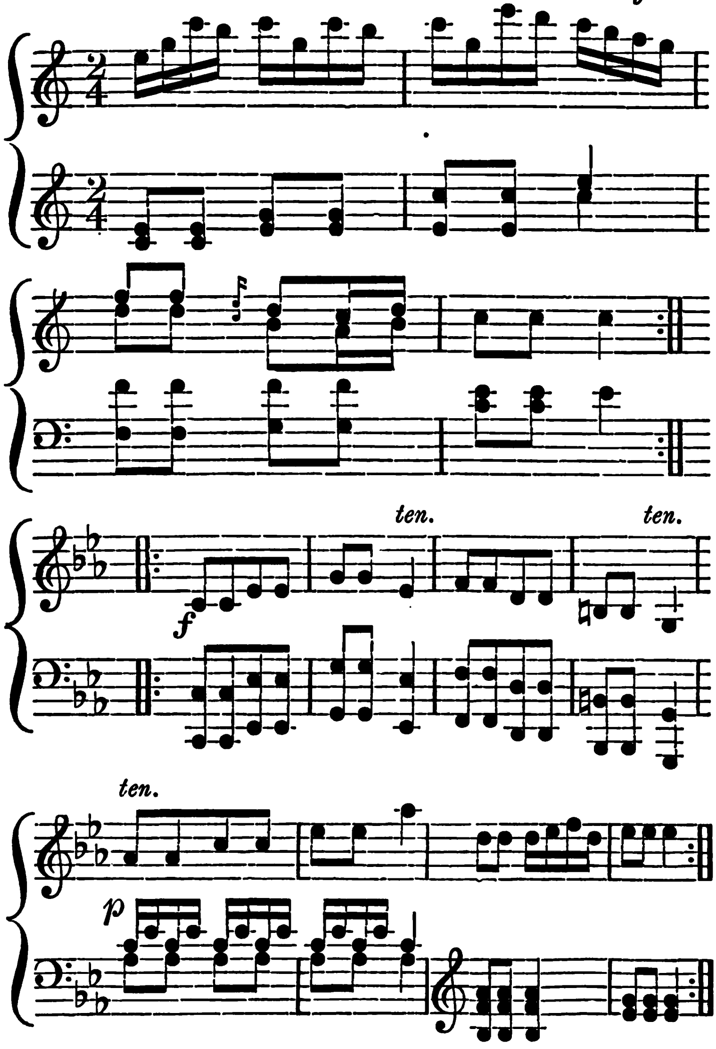
* See Appendix (N N).

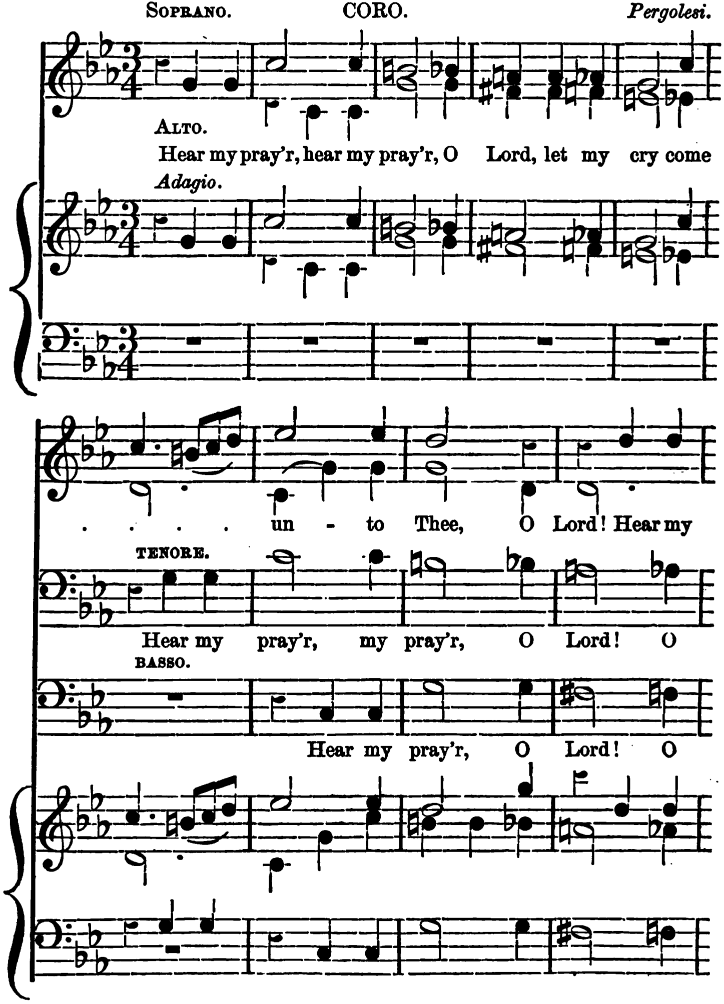
† As to the term *relative* minor, vide sup. p. 13.

Haydn.



The remaining progression is that which is commonly described as a *chromatic passage,* that is, a passage containing semitones in succession, some of which are of the chromatic, and others, of the diatonic kind*.

Chromatic passages are of frequent occurrence in music; but are never so appropriately and powerfully employed as in the expression of feelings of a mournful or pensive kind. The following example is extracted from one of the pieces of a celebrated master.


SOPRANO.
CORO.
Pergolesi.
ALTO.
Hear my pray'r, hear my pray'r, O Lord, let my cry come
Adagio.
. . . . . un - to Thee, O Lord! Hear my
TENORE.
Hear my pray'r, my pray'r, O Lord! O
BASSO.
Hear my pray'r, O Lord! O

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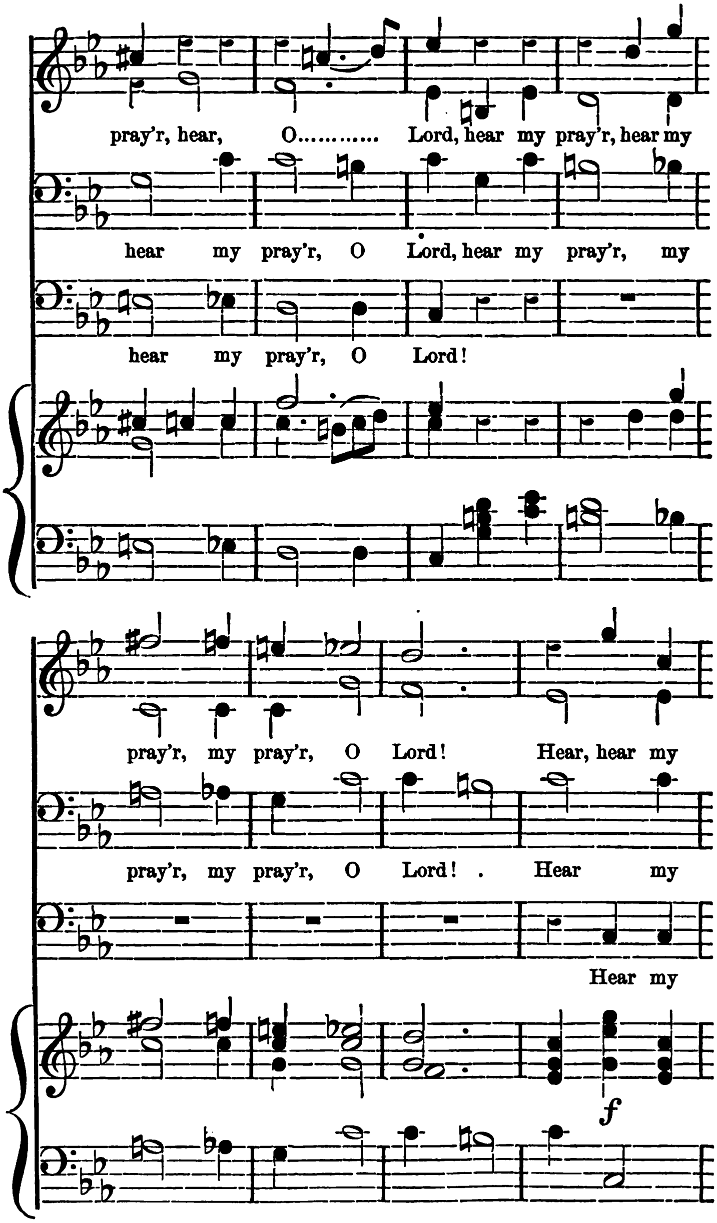
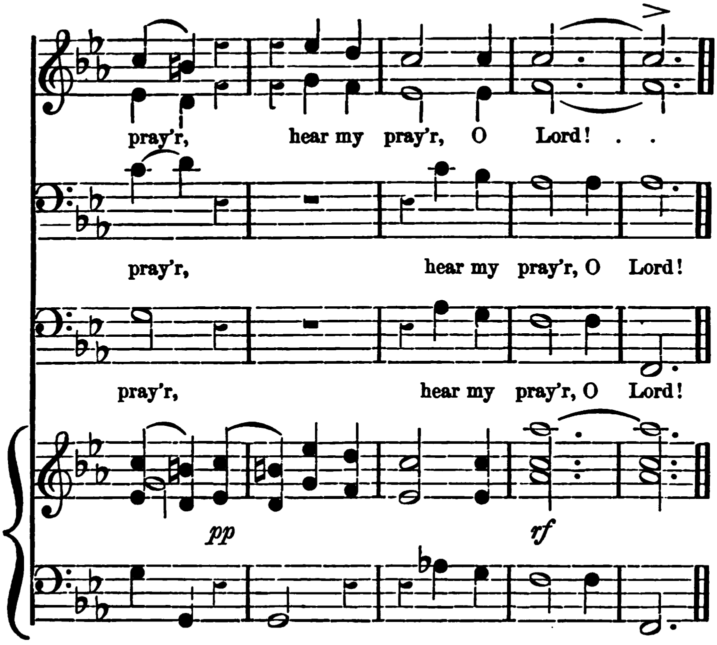
* As to chromatic and diatonic semitones, vide sup. pp. 27, 28; and as to chromatic passages, see Appendix, Note (O O).


pray'r, hear, O............ Lord, hear my pray'r, hear my
hear my pray'r, O Lord, hear my pray'r, my
hear my pray'r, O Lord!
pray'r, my pray'r, O Lord! Hear, hear my
pray'r, my pray'r, O Lord! . Hear my
Hear my
f


pray'r,
hear my pray'r, O Lord! . .
pray'r,
hear my pray'r, O Lord!
pray'r,
hear my pray'r, O Lord!
pp
rf

CHAPTER IV.

OF THE RATIOS INVOLVED IN MUSIC— AND OF TEMPERAMENT[*].

THE pitch or elevation of a note depends on the degree of the frequency of the vibrations of the string or other sounding body by which it is produced[†].

The frequency of the vibrations in strings increases with their *shortness, lightness,* and *tension.* It is found that a string of one-half the length, or one-fourth the weight, or of four times the tension, of another string, vibrates twice as fast, on any of these accounts[‡].

According to the musical scale now in use, the numerical expression (fractionally) of the ratios of the vibrations productive of the notes in any key in the major mode, ascending from the fundamental or key-note (suppose C), to the vibrations productive of *that* note—is as follows:

C	D	E	F	G	A	B	C[§]
1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	2

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[*] See Appendix, Note (PP).

[†] Holder, on Harmony, p. 56; Arnott's Physics, vol. i, p. 511.

[‡] Arnott's Physics, vol. i, p. 506; Whewell's Inductive Sciences, vol. ii, p. 333.

[§] See Appendix, Note (QQ).

which makes the ratios of the vibrations as between any two *contiguous* notes as follows:

C to D	D to E	E to F	F to G	G to A	A to B	B to $\bar{C}$[*]
$\frac{9}{8}$	$\frac{10}{9}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{10}{9}$	$\frac{9}{8}$	$\frac{16}{15}$

The intervals of $\frac{9}{8}$ are called *major tones;* those of $\frac{10}{9}$ *minor tones;* and those of $\frac{16}{15}$ *semitones;* so that the whole scale in the major mode, which was before stated, generally, and in a way sufficient for practical purposes, to consist of *tone, tone, semitone, tone, tone, tone, semitone*[†], consists, if more closely and scientifically considered, of

Major tone, minor tone, semitone, major tone, minor tone, major tone, semitone.

On inspection of these ratios, it will be apparent that they are all based on the four lowest prime number[‡], 1, 2, 3, 5; and that there is not a single instance in which any of the higher prime numbers, such as 7, 11, 13, &c. is concerned.

This is a remarkable fact; and such as to suggest the conception that the scale might possibly have originated in a course of invention, of which the leading idea was, that of applying the lowest possible prime numbers to the the formation of a system of sounds, separated from each other by such distances of pitch as are found suitable to the human voice, and sufficient in number for the purposes of song. It is by no means intended to express an opinion that such was in fact the history of the matter. The evidence, indeed, that exists on the subject tends to the conclusion, that the scale is due to no single idea or single inventor, but was in the nature of a satisfactory and final improvement upon preceding arrangements, by which it had been in part anticipated[§]. But, however this may be, it will be both useful and curious to endeavour to trace the progress by which the single idea, that has been referred to, *might* in the nature of things have led some particular inventor to this great discovery.

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[*] See Appendix, Note (RR).

[†] Vide sup. p. 3.

[‡] A prime number is one divisible into no equal parts greater than unity.

[§] See Appendix, Note (SS).

He shall be supposed then to set out by taking a string sounding some particular note, as C. His next step would be to take another string, whose vibrations would be to the vibrations of the first as the prime number 2 to 1; and he would find that this sounded $\bar{C}$, the octave ascending, which his ear would feel as substantially the same sound *, so that the first note would return, as it were, into itself; and though he might go higher or lower by the repeated use of the same numbers, 1 and 2, ascending or descending,—for example, by resorting to strings which should vibrate in proportion to C as 4 : 1, or as $\frac{1}{2}$: 1, these would still produce only new repetitions or octaves of the first note, yielding substantially the same sound.

To obtain new notes, therefore, he would be obliged to resort to the next lowest prime number, 3, by taking a string which should vibrate in proportion to C, as 3 : 1. This would produce a note in the second octave ascending, viz. the octave commencing with $\bar{C}$; for $\bar{C}$ is to C, as 2 : 1, and the 8th above it would consequently be as 4 : 1; and, therefore, 3 : 1 would fall between these, or, in other words, within the limits of the second octave ascending. But the interval between this note and C would be too great to suit the voice or ear, so far as ordinary musical purposes are concerned. It would be necessary, therefore, to lower this new note, so as to bring it within the first octave; and this might be done by the application of number 2, as a divisor, or, in other words, by resorting to a string which should vibrate as $\frac{3}{2}$: 1, which would give him G in the first octave †. If he were now again to employ number 3, by taking another string vibrating three times as often as string 3, viz. as 9 : 1, it would sound a note in the fourth octave ascending, which, being much too remote from the original note, would require to be lowered; and this might be done by the repeated application of number 2, as a divisor, viz. by resorting to a string vibrating $\frac{1}{8}$th as often as string 9 (or as $\frac{9}{8}$: 1); and this would bring the new note down within the compass of the first octave; when it would become note D in the first octave.

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* Vide sup. p. 2.

† At this and the remaining stages of the process, reference may be made to the Ratios, sup. p. 97.

Deserting now (for the present) number 3, and taking the next lowest prime number instead; suppose him to resort to another string, vibrating in proportion to C, as 5 : 1. This string would produce a note in the third octave ascending, which, being lowered (upon the same principle as in the former cases) by the repeated application of number 2, as a divisor, so as to be expressed by $\frac{5}{4}$: 1, would become E in the first octave. And if he were to apply to this same string 5, the former number of 3, taking a string which should vibrate in proportion to C, as 15 : 1, it would produce a note in the fourth octave ascending, which, being lowered by the repeated application of 2, as a divisor, so as to be expressed by $\frac{15}{8}$: 1, would become B in the first octave.

He would thus have obtained C, D, E, G, B, $\bar{C}$; and in order to obtain two other notes, such as would divide the large intervals in this manner left between E and G and between G and B, as well as increase the variety of sounds, he might recur again to the number 3, and take another string, the vibrations of which should be in the *descending* series, viz. as $\frac{1}{3}$: 1, so that this string would be exactly as much below string 1, as string 1 was below string 3. This new string would yield a note in the second octave descending, which, being *raised* (upon the same principle that the note was *lowered* in the former cases) by the repeated application of number 2, as a multiplier, so as to be expressed by $\frac{4}{3}$: 1, would become F in the first octave. And if he were next to apply to this same string of $\frac{1}{3}$ the number 5 as a multiplier, he would have a note standing in relation to the key-note as $\frac{5}{3}:1$, and falling within the first octave; which note so obtained would be A, and the first octave would consequently be complete *.

All this process may be summed up in the following

TABLE.

String vibrating as

1, will produce	Key-note
2	8th
$\frac{3}{2}$	5th
$\frac{3\times3}{2\times2\times2}\ (=\frac{9}{8})$	2nd
$\frac{5}{2\times2}\ (=\frac{5}{4})$	3rd
$\frac{5\times3}{2\times2\times2}\ (=\frac{15}{8})$	7th
$\frac{1}{3}\times2\times2\ (=\frac{4}{3})$	4th
$\frac{1}{3}\times5\ (=\frac{5}{3})$	6th

From the preceding considerations it appears that the simple imtervals of the scale in the major mode, both those which are formed with the key note, and those which, without being of that character, are formed between contiguous notes †, are all founded on the four lowest prime numbers, 1, 2, 3, 5; and it is further to be understood that the foundation of all the other intervals of the scale, whether in the major or minor mode, and of all the extraneous intervals, is the same; as may be illustrated by the

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* We have been here engaged on the ratios of the simple intervals of the scale, in the major mode. And to this mode, for the sake of brevity, we confine ourselves. If those in the minor mode be investigated, they will be found, in like manner, to be made up of the same prime numbers.

† Vide sup. pp. 97, 98.

following Table, which comprises the chief musical intervals of all kinds, and at the same time exhibits in what manner and in what proportion the prime numbers in question enter into each interval.

TABLE.

		Compounded of
A Semitone (or Diatonic Semitone)	$\frac{16}{15}$	$\frac{2\times2\times2\times2}{5\times3}$
Minor Tone.................	$\frac{10}{9}$	$\frac{5\times2}{3\times3}$
Major Tone.................	$\frac{9}{8}$	$\frac{3\times3}{2\times2\times2}$
Minor Third................	$\frac{6}{5}$	$\frac{3\times2}{5}$
Major Third..................	$\frac{5}{4}$	$\frac{5}{2\times2}$
Fourth.....................	$\frac{4}{3}$	$\frac{2\times2}{3}$
Tritone.....................	$\frac{45}{32}$	$\frac{3\times3\times5}{2\times2\times2\times2\times2}$
Minor Fifth................	$\frac{64}{45}$	$\frac{2\times2\times2\times2\times2\times2}{3\times3\times5}$
Fifth	$\frac{3}{2}$	$\frac{3}{2}$
Minor Sixth	$\frac{8}{5}$	$\frac{2\times2\times2}{5}$
Major Sixth................	$\frac{5}{3}$*	$\frac{5}{3}$

* See Note, Appendix (TT).

Minor Seventh.............	$\frac{9}{5}$*	$\frac{3\times3}{5}$
Major Seventh.............	$\frac{15}{8}$	$\frac{3\times5}{2\times2\times2}$
Octave....................	2	2
Minor Ninth	$\frac{32}{15}$	$\frac{2\times2\times2\times2\times2}{3\times5}$
Major Ninth...............	$\frac{9}{4}$	$\frac{3\times3}{2\times2}$
Minor Tenth...............	$\frac{12}{5}$	$\frac{2\times2\times3}{5}$
Major Tenth...............	$\frac{5}{2}$	$\frac{5}{2}$
Eleventh......	$\frac{8}{3}$	$\frac{2\times2\times2}{3}$
Twelfth	3	3
Minor Thirteenth	$\frac{16}{5}$	$\frac{2\times2\times2\times2}{5}$
Major Thirteenth	$\frac{10}{3}$	$\frac{5\times2}{3}$
Minor Fourteenth..........	$\frac{32}{9}$	$\frac{2\times2\times2\times2\times2}{3\times3}$
Major Fourteenth..........	$\frac{15}{4}$	$\frac{3\times5}{2\times2}$

* See Note, Appendix (UU).

Fifteenth	4	2×2
Minor Sixteenth	$\frac{64}{15}$	$\frac{2\times2\times2\times2\times2\times2}{3\times5}$
Major Sixteenth	$\frac{9}{2}$	$\frac{3\times3}{2}$
Minor Seventeenth	$\frac{24}{5}$	$\frac{2\times2\times2\times3}{5}$
Major Seventeenth	5	5
Enharmonic Interval	$\frac{128}{125}$	$\frac{2\times2\times2\times2\times2\times2\times2}{5\times5\times5}$
Chromatic Semitone	$\frac{25}{24}$*	$\frac{5\times5}{2\times2\times2\times3}$
Augmented Second	$\frac{75}{64}$	$\frac{3\times5\times5}{2\times2\times2\times2\times2\times2}$
Diminished Minor Third	$\frac{144}{125}$	$\frac{3\times3\times2\times2\times2\times2}{5\times5\times5}$
Augmented Major Third	$\frac{125}{96}$	$\frac{5\times5\times5}{3\times2\times2\times2\times2\times2}$
Diminished Fourth	$\frac{32}{25}$	$\frac{2\times2\times2\times2\times2}{5\times5}$
Augmented Fourth	$\frac{25}{18}$	$\frac{5\times5}{3\times3\times2}$
Diminished Fifth	$\frac{36}{25}$	$\frac{3\times3\times2\times2}{5\times5}$

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* See Note, Appendix (VV).

Augmented Fifth........... $\frac{25}{16}$	$\frac{5\times5}{2\times2\times2\times2}$
Diminished Minor Sixth...$\frac{192}{125}$	$\frac{3\times2\times2\times2\times2\times2\times2}{5\times5\times5}$
Augmented Major Sixth (or Extreme Sharp Sixth)......................$\frac{125}{72}$	$\frac{5\times5\times5}{2\times2\times2\times3\times3}$
Diminished Minor Seventh ....$\frac{128}{75}$*	$\frac{2\times2\times2\times2\times2\times2\times2}{5\times5\times3}$

TEMPERAMENT.

It results from the ratios of the scale, as set forth, sup. pp. 97, 98, that it is impossible to have a musical instrument so tuned, that the several intervals of a given key shall be in exact accordance with these ratios, without the formation, in particular instances, of false concords, and false to an extent that the ear will not tolerate.

Thus (referring back to the scale in the key of C major, as there exhibited), it will be apparent that if we suppose a pianoforte to be so tuned that the intervals which D, E, F, &c. make with C, exactly accord with the ratios 1, $\frac{9}{8}$ $\frac{5}{4}$ $\frac{4}{3}$, &c. placed under them, the interval D F, will of necessity be a false concord of this description. For, on examination, we shall find that from

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* See Note, Appendix (WW).

D to E, there is a minor tone $\frac{10}{9}$[*], and from E to F, a semitone $\frac{16}{15}$[†]; which makes the ratio of D F, $\frac{10}{9} \times \frac{16}{15} = \frac{32}{27}$. Now this is an approximation to the concord of a minor 3rd (viz. $\frac{6}{5}$)[‡], but falls short of it by $\frac{81}{80}$ (for $\frac{6}{5} - \frac{32}{27} = \frac{81}{80}$); and $\frac{81}{80}$ (called by scientific writers, a *comma*), is an amount of deficiency from a given concord, that the ear does not tolerate. Again, if we pass from one key to another, for example, from the key of C major, to that of G major, viz. G, A, B, C, D, &c. the interval from A to D will be a false concord; for from A to B there is a major tone ($\frac{9}{8}$); from B to C, a semitone ($\frac{16}{15}$); and from C to D, a major tone ($\frac{9}{8}$)[§]; which makes the ratio of A D, $\frac{9}{8} \times \frac{16}{15} \times \frac{9}{8} = \frac{27}{20}$. And this is an approximation to the concord of a 4th (viz. $\frac{4}{3}$)[‖]; but exceeds it by a *comma* (for $\frac{27}{20} - \frac{4}{3} = \frac{81}{80}$); and a *comma* is an amount of excess upon a given concord, which the ear will not tolerate. To these instances others might be added; but these are sufficient to prove the proposition above advanced.

The difficulty above described occasions a resort to the method of *Temperament;* which consists in so tuning an instrument as to mitigate, or *temper,* to a point that is satisfactory to the ear, all false concords in any of the keys; though in order to accomplish this, it is found that some slight deviation from almost all the ratios must be made, or, in other words, that hardly any of the intervals can be made absolutely true. The particular course most usually pursued for the purpose, is to take successive *fifths* from some note which forms the starting point, tuning each of these slightly *flat.* By taking such fifths, intermixed with octaves, as convenience requires, the operation in question is fully performed; and it is to be remarked that upon the correct plan of tuning, the *octaves* are made absolutely true; which under the method of flattening the 5ths, is practicable consistently with the object of temperament; and which it is of great importance to effect, as an octave is the interval in which the ear least tolerates imperfection.

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[*] Vide sup. p. 98.

[†] Vide ibid.

[‡] Vide sup. p. 102.

[§] Vide sup. p. 98.

[‖] Vide sup. p. 102.

From these explanations it may easily be inferred that temperament is a method required only for "instruments with fixed keys," as they are called *,—or, as we may otherwise describe them, instruments in which (as in the pianoforte) the state of all the intervals depends upon the tuning, and is incapable of being modified by the finger in the act of playing. In the case of the violin, such modification is used with regard to almost all the intervals; so that the performer is enabled, by the use of his ear and finger, to avoid all false concords; and the difficulty against which temperament is provided, does not arrise.

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* This is an instance of bad nomenclature. The word *keys* is not here used in the ordinary sense (as to which, v. sup. p. 2), but in the sense of finger-notes.

CHAPTER V.

OF THE PRINCIPLE UPON WHICH MUSIC PLEASES THE EAR.

We will proceed now to make some attempt towards the solution of the curious and interesting question, what it is that forms the source of the pleasure which the ear derives from music in general. We say music *in general,* or, as it may be otherwise expressed, music in the abstract; because the proposed investigation will have no reference to the effects which belong to *particular pieces or passages* of music; though, as to these, we may take the opportunity of remarking summarily, that the pleasure they afford seems to arise, in great part, from the constant reference to some given key, and the skilful departure from and return to it (suggesting probably to the mind the ideas of arrangement and contrivance); and that it also frequently results from *imitative* artifices, exciting ideas of a pleasing or impressive character, by some sort of resemblance which the sounds bear to particular scenes, actions, or objects. But our present inquiry is of a more abstract kind, and almost entirely relates to the pleasure derived from *musical* sounds in general (whether individual sounds, concords, or discords), as opposed to sounds that are *unmusical.*

And, in the course of our remarks, we shall advert, first, to the case of a musical sound individually considered; and then to the case of several musical sounds heard in connexion with each other, whether connected in the way of succession or of contemporaneous combination.

1. With respect to a musical sound, individually considered, it is clearly established as one of its necessary conditions that the vibrations of the string, or other sonorous body producing it, should in point of frequency range within certain limits; the sound becoming unmusical when the vibrations, as to their number in a given time, exceed one of these limits, or fall below the other. What these limits are, may perhaps be not fully settled*; and it is possible that they may vary in some degree with different ears.

As to this condition of a musical sound (the degree of frequency in the vibrations), the reason on which it rests is somewhat obscure. We may conjecture, however, that when the vibrations reach a certain degree of frequency, their rapidity confounds the ear, and prevents their separate character from being perceived; and that so, on the other hand, when they fall below a certain degree of frequency, the slowness of their succession prevents the ear from connecting them together. But the condition to which we have referred is not the only one that belongs to a musical sound. It is also essential to it, that the vibrations of the body producing it should be uniform, that is, that the number should be equal in equal times; as to which condition, we may add this remark, that, in order to secure its observance, the string or other sounding body should itself be of regular or symmetrical shape.

2. In proceeding to inquire into the second point, viz. the source of the pleasure derived from several musical sounds heard in connexion with each other, it will be useful to advert to the following facts.

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* Vide sup. p. 3, Note †.

1st. *The ratios of all the musical intervals, whether concordant or discordant, are based on the four lowest prime numbers, 1, 2, 3, 5, to the exclusion of the higher prime numbers, such as 7, 11, &c.*

This has been sufficiently established and illustrated in the course of the last chapter.

2nd. *The ratios of the concordant musical intervals are based on the numbers 1, 2, 3, 5, in their primary form, or multiplied only by 2, or by some power of 2; but the ratios of the discordant musical intervals, on the product of the higher numbers 3 and 5, multiplied into each other, or of one of these higher numbers, multiplied into itself.*

This remarkable distinction, which the author does not recollect to have seen pointed out in any other work, will be manifest on the face of the last Table. Thus the ratio of the concordant interval of a minor 3rd (viz. $\frac{6}{5}$) consists of $\frac{3\times2}{5}$; and that of the concordant interval of the major 3rd (viz. $\frac{5}{4}$), of $\frac{5}{2\times2}$; but the ratio of the discordant interval of a semitone (viz. $\frac{16}{15}$), consists of $\frac{2\times2\times2\times2}{5\times3}$; and the ratio of the discordant interval of a minor tone (viz. $\frac{10}{9}$) of $\frac{5\times2}{3\times3}$. And so of all the other concordant and discordant intervals *.

When these facts are carefully considered, they seem to warrant the conclusion, that the pleasure derived from music in the abstract, when the sounds are heard in connection with each other, is the result of the simplicity of certain of the ratios on which the musical connections are founded, and which have for their basis, 1, 2, 3, 5—a simplicity which makes those ratios so far perceptible to the ear, as to affect it with a certain sense of order and proportion, mingled with a sufficient variety—while other of these ratios, viz. such as produce sounds which (though musical) are too harsh for the ear, and also the ratios on which the unmusical connections are founded, and which have for their basis, 7, 11, &c. are too complex to convey any sense of this description. That this is the true source of the pleasure in question, will appear the more probable, if we consider the analogous effect on the eye, when it is with the sense of affected order and proportion, mingled with due variety, in architecture, or other productions of art. To enquire further, and to attempt to investigate the principle on which this sense should in either case be productive of pleasure, would be to enter upon speculations beyond the design of this work. But we will hazard the suggestion, that, so far as order and proportion at least, are concerned, it may be referred, with some probability, to the idea, that they naturally convey, of *design*, and may thus be traced to a moral and intellectual source.

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* This sort of *generic* difference between concords and discords, is of the more importance, because great difficulty has been found by theorists, in accounting for the very different kind of effect which they produce upon the ear.

The views above suggested, though in some respects peculiar to the present work, have *in substance* been advanced by several theorists; and it is no new doctrine that the charm of music, in the abstract, depends upon the simplicity of the ratios of vibration between the several bodies which emit the sounds, and the sense of order and proportion which is consequently impressed upon the ear. Yet there are considerations which appear to conflict with these views, and which call therefore for some remark. One of them is, that the pleasure in question, if derived from the particular ratios between the notes, would naturally be affected by any change in those ratios; but that though in fact they are almost all of them altered on instruments with fixed keys, by the effect of *temperament*, yet (as regards persons in general) we do not find that the agreeableness of the musical sounds is thereby sensibly impaired. But, to this, it seems a sufficient answer, that a very small alteration of the ratios, such as is involved in temperament, does not suffice to prevent us from receiving the general impression of them; that our sense of sounds is not so nice but that the ear is content to take the tempered interval as the true one; and that though it tolerates no such imperfection in the *octave*, which temperament consequently leaves untouched, that is because the ratio of 2 : 1 is so particularly simple as to cause it to be discerned with more precision, and, therefore, to render the least departure from it painfully observable.

Another difficulty, however, presents itself; viz. that of conceiving how the ear should be capable of forming any appreciation of the ratio, even when simple, that exists between the vibrations of bodies emitting different musical sounds, more particularly when the great rapidity of such vibrations is taken into account. But it is clear that our senses have a certain intuitive power to perceive order and proportion, in a general way, though they are not ascertained with precision; as in the example of architecture, where the eye receives at first sight immediate impression of the symmetry of an edifice, though there has been no opportunity of measuring, or maturely considering, the relative dimensions of the different parts. And as regards the ear in particular, and the impression it receives of order and proportion in musical sound, there is a fact closely illustrative of the intuitive faculty to which we refer; viz. that in the performance of a piece of music, every musician has a clear and accurate sense of the *time* to which it is composed, and of the several changes which the time may undergo, and the degree of regularity with which it is observed; even though he make no resort to beating or counting, to ascertain its rate or correctness. It is remarkable, too, that the same elementary numbers are concerned in the case of time, as in that of harmonic intervals; viz. 2, 3, and 5. For the ear will tolerate no time in music, but that of 2, 3 (or, at most, 5) crotchets, quavers, &c. (or their multiples) in a bar. The limitation is, indeed, somewhat stricter than in the harmonic intervals; for the time of 5 (though practicable) is of such unusual occurrence, that the two former numbers alone may be said universally to prevail.*

Upon the whole, then, no sufficient reason occurs for doubting the correctness of the theory above maintained—that the charm of music, in the abstract, when the sounds are heard in connection with each other, depends on the pleasure which the ear derives from that sense of order and proportion (mingled with sufficient variety), which the simple ratios uniformly founded on the four lowest prime numbers, have a tendency to produce. It is a theory which seems to have been approved by a large portion at least, of those to whom it has at various times been presented; and it is believed, that increasing observation and reflection will confirm the conviction of its truth.

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* See Appendix Note, (YY).

APPENDIX.

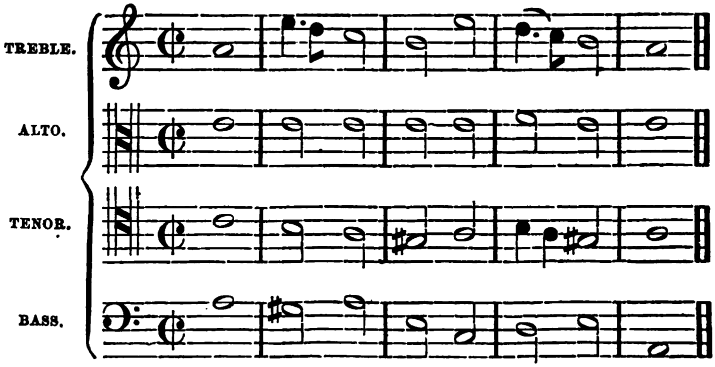
(A), p. 3. Any particular sound required may be fixed by a metallic instrument called a tuning fork, the vibrations of which, on being struck, will produce that sound. Thus, a tuning fork of the proper size and construction will produce that sound which musicians agree to call note A or note C; and a tuning fork of that size and construction consequently becomes the universal standard of that note.

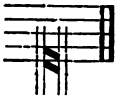
(B), p. 3. It is said, in Lardner's Museum, vol. iii, p. 200, that on a seven-octave piano, the highest note in the treble (A) is produced by 3520 complete vibrations in a second, the lowest in the bass (A), by 27½.

(C), p. 6. The Treble clef places the note G on the 2nd line of the staff, and makes every note one 13th higher than if it stood on the same line or space in the Bass clef.

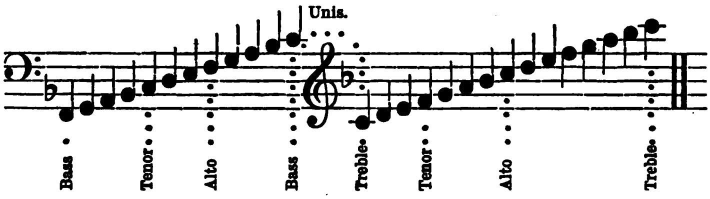
The Alto (or Counter Tenor) clef places the note C on the third line of the staff, and makes every note one 7th higher than if it stood on the same line or space in the Bass clef.

The Tenor clef places the same note C on the 4th line of the staff, and makes every note one 5th higher than if it stood on the same line or space in the Bass clef. The following is an example of music set in these four clefs together.



There is also (among others used in the old music) the Soprano clef,  which places C on the 1st line, and makes every note a 3rd lower than if it stood on the same line or space in the Treble clef.

(D), p. 6. The usual compass or range of notes respectively belonging to Bass, Tenor, Alto, and Treble voices, when well cultivated, may be exhibited as follows:



The Bass and Tenor voices are those of men; the Treble (or Soprano), of women; and the Alto voices may be found in either sex. Besides these principal divisions, there is, among men, the compass of Baritone, higher than Bass, and lower than Tenor, and of Counter Tenor, higher than Tenor; and among women, of Mezzo Soprano, lower than Soprano, and Contralto, lower than Mezzo Soprano.

(E), p. 12. Considered in one point of view, the number of keys is 21 in each mode (42 in all); for within the octave there are 7 different notes; each of which may be taken in three different ways—viz. as natural, as sharp, and as flat; and, taken in each way, may be made a key-note. Considered in another point of view, the number of keys is 15 in each mode (30 in all); for within the octave in each mode there is one key with the natural signature, 7 with sharp signatures, and 7 with flat, as shewn, sup. pp. 12—16. Considered, lastly, in another point of view, the number of keys is 12 in each mode (24 in all); for not only all the 15 keys in each mode, but all the 21, are capable of being substantially expressed by 12. To explain this, it should be stated that in the 21 keys some of the key-notes are separated only by what is called an *enharmonic* interval, of which the ratio is $\frac{128}{125}$, and that, owing to the slightness of this difference, they are substantially identical to the ear. Thus the key-note G♯ is substantially identical with A♭. This being the case, one key may stand for two. Thus the key of A♭ may stand also for that of G♯; and, upon the same principle, it will be found that 8 other pairs of keys may be represented by 8 single keys; which reduces the 21 keys to 12. And it is upon this last arrangement that the construction of instruments with fixed finger-notes, like the pianoforte, is founded; for these finger-notes never exceed 13 (productive of 12 key notes), within the limits of the octave.

(F), p. 13. The reason for the augmentation in the 7th note is, that without this expedient, the key remains undecided. Thus, if in a melody we hear only the notes A, B, C, D, E, F, we are in uncertainty whether the key be A minor or C major; for all the notes equally belong to both keys. But by introducing G ♯, the key of A is suggested; because G ♯ is the *leading* note in the key of A—that is, the note which leads the ear to A, as to the key note which stands *nearest;* its distance from G ♯ being only a semitone; and as we perceive, at the same time, that the note C is natural, and not sharp—or, in other words, that the 2nd interval ascending from the tonic A, is B C, a semitone, and not B C♯, a tone (a circumstance characteristic of the *minor* mode, which, when ascending, has a semitone in the 2nd place—vide sup. pp. 2, 13)—it thus appears on the whole that the key is A minor.

(G), p. 13. Though the 6th in the ascending minor scale has an augmentation, yet it is to be remarked that the 3rd in the descending minor scale (v. sup. p. 12) is the same note *without* augmentation—and as both in ascending and descending passages, this 3rd descending is in frequent use, it follows that in the same key, we have the same note (for example, in A minor the note F) practically occurring, both as augmented and unaugmented. In like manner, though the 7th of the ascending scale is with augmentation, yet the 2nd of the descending is the same note with *none.* This 2nd of the descending, however, does *not* occur in practice, the augmentation being necessary in order to decide the key, as shewn, sup. Note (F).

(H), p. 14. The augmented note of the 6th ascending in this case is expressed, it will be observed, not by a ♯, but a ♮. (As to these marks, v. p. 7.) The B being flat in the descending series in the key of D minor, its augmentation by a semitone in the ascending series makes it ♮, or natural.

(I), p. 20. This, it will be observed, is *common* time, according to the definition above given (p. 18): for the number of notes in the bar (6 or 12) is divisible by 2; and again it is *compound,* because the bar in $\frac{6}{4}$ time may be considered as made up of two bars of $\frac{3}{4}$ time; in $\frac{6}{8}$ time, as made up of two bars of $\frac{3}{8}$ time; and in $\frac{12}{8}$ time, or its equivalent $\frac{24}{16}$ time, as made up of 4 bars of $\frac{3}{8}$ time.

(K), p. 21. This is *triple* time, according to the definition above given (p. 18); for the number of notes in a bar—viz. 9—is divisible by 3, and not by 2. Again it is *compound,* because the bar in $\frac{9}{4}$ time may be considered as made up of a bar and a half of $\frac{6}{4}$ time; in $\frac{9}{8}$ time, as made up of a bar and a half of $\frac{6}{8}$ time; and in $\frac{9}{16}$ time, as made up of a bar and a half of $\frac{3}{8}$ time, or of $\frac{6}{16}$ time, which is equivalent.

(L), p. 22. The terms *tonic*, *dominant*, and *subdominant*, are of French origin. The French harmonists called the first or key-note *tonic*, because it is the foundation of the key *(ton)*;—the 5th ascending, the *dominant*, because (except in the somewhat rare case of a Plagal full cadence) this note with its common chord or its chord of the 7th forms the immediate antecedent to the concluding chord in the full cadence—(v. sup. pp. 78, 79, 80), so that it may be said to *govern* the full cadence; and the 4th ascending, the *subdominant*, because, taken an octave lower, it is a 5th below the tonic, as the dominant is a 5th above it. As to the term *leading note* (which is applied to the 7th ascending, both in harmony and melody), it has been adopted because that note leads the ear to the key, upon the principle explained in Note (F), supra. It is called, by the French, *la note sensible*, in reference to the same property. Denominations of the same significant kind are also frequently applied to the other notes of the scale. Thus the 2nd ascending is called, in many treatises, the *supertonic*, the 3rd ascending the *mediant*, the 6th ascending the *submediant*. But these are in less general use, and of questionable utility.

(M), p. 23. A minor 3rd is otherwise called a *flat* 3rd; a tritone, a *sharp* 4th; a minor 5th, a *flat* or *false* 5th; a minor 7th, a *flat* 7th; and a major 7th, a *sharp* 7th. But these terms of *flat*, *sharp*, and *false*, have a tendency to convey erroneous ideas as to the nature of the interval described. The nomenclature in the text is obviously far preferable, and is that, in fact, now generally adopted by the best writers. Some of these, indeed, give the 4th the appellation of a *true* 4th, and the 5th the appellation of a *true* 5th, to distinguish them from a tritone and minor 5th respectively. But it is better to speak of 4ths and 5ths generally, and to suppose them the true intervals intended, unless the contrary be expressed.

(N), p. 27. The *diatonic semitone* is so called because the scale itself to which it belongs, and which consists of tones and of semitones of this kind, is sometimes called the *diatonic scale*, to distinguish it from other scales. For scales of a nature different from this, appear to have been in use in ancient Greece, and to be now in use in some eastern countries. No other scale than this, however, exists in modern Europe; for though passages occur in which intervals of a different kind from tones or semitones, viz. chromatic semitones and enharmonic intervals, are introduced, for the sake of a particular effect, no entire piece is ever composed consisting in the main of any intervals except tones and diatonic semitones.

(O), p. 27. The term *extraneous* is not in common use in reference to intervals foreign to the scale, nor have they any appellation common to them all. But they *ought* to have; and that of *extraneous* intervals is both correct and convenient. Such of them as are here classed under division 3 (see p. 27, 28), are described, in the treatises, either as "altered intervals," *inter-*

valles altérés (see Traité de l'Harmonie, par M. Fétis), or as "augmented or diminished intervals." It deserves remark, with reference to an altered interval, that on instruments with fixed keys, and consequently tuned by *temperament* (as to which, v. sup. p. 105), such an interval is, in some instances, represented by the same sounds as a concordant one; and, in every instance, by the same sounds as some interval of the scale, either concordant or discordant. Thus the augmented 2nd, C D♯, has, on the instruments in question, the identical sounds of the minor 3rd, C E♭, which is a concordant interval; and the extreme sharp 6th, F D♯, the identical sounds of the minor 7th, F E♭, which is a discord of the scale. However, C D♯ is not a concord, and really differs from C E♭, by an enharmonic interval; and F D♯ is not a discord of the scale, and really differs from F E♭ by the like interval. It is a curious fact, that this difference between any altered interval and that interval of the scale which, on an instrument with fixed keys, is expressed by the same sounds—for example, between C D♯ and C E♭, or between F D♯ and F E♭—is perceptible even upon an instrument with fixed keys (notwithstanding the actual identity, in that case, of the sounds), if the course of the harmony be such as to indicate that an altered interval, and not an interval of the scale—for example, C D♯, and not C E♭, or F D♯, and not F E♭—is intended.

(P), p. 27. In the table given by M. Fétis, of the intervalles altérés, he introduces also the *diminished octave*, and the *augmented octave;* but the utility of the introduction seems questionable. On the other hand, he omits the *augmented* 4th and the *diminished* 5th, considering them, perhaps, as identical with the *tritone* and *minor* 5th. But there is, in fact, no such identity, except upon instruments with fixed keys; the ratios of all these intervals being different, as shown in the Table of ratios contained in the present work, sup. pp. 102, 105. See also Rees's Cyc. Tit. Interval, and the Table there, with the heads of Superfluous 4th and Diminished 5th.

(Q), p. 31. This chord is called, by German and latterly by some English writers, the *triad*. But the correctness of the appellation may reasonably be questioned; for it is not (properly speaking) a chord of three notes, but of four; viz. 1st, 3rd, 5th, and 8th. The appellation of triad throws out of the account the 8th, and does so upon the ground, that, being a mere replicate of the bass note, it is substantially the same sound. Yet, in fact, it forms an important element in the chord, to the more full and complete effect of which the ear feels it to be essential, and any appellation which tends to exclude it is consequently defective. The French term of *accord parfait* is not open to this objection; but even this is of more doubtful propriety than our English one of the *common chord*. Its being the more *common* or frequent, is a matter of fact, on which it is better to rely than on its *perfection*, which is of doubtful meaning. The incorrectness above mentioned occurs also with respect to the *common chord minor*, which is sometimes called the *minor triad*.

(R), p. 32. An important and curious fact relating to the common chord major is, that it is the *product of nature itself*. For it is found by experiment, that any string or other body capable of emitting a musical sound yields, upon being struck, not only its principal note, but these secondary notes also (distinctly perceptible to a nice ear), viz. the 8th ascending, the 12th ascending, and the 17th major ascending, of its principal note (Whewell, Induct. Sci. vol. ii, p. 349); in other words, notes comprising the common chord major; for if the 12th and 17th be lowered, the first an octave, and the second a double octave, they become the 5th and 3rd respectively of the principal note; and the sounds then consist of the principal note, with its 3rd, 5th, and 8th, which (as we have seen) constitute the common chord major. This experiment reasonably attaches to the common chord major, the repute of being the product of nature itself; for the 8th, 12th, and the 17th are only secondary notes (or *harmonics*, as they are called), distinctly perceptible. The sounding body, however, in fact yields a great many others of a fainter kind, formed by aliquot parts of that body, not concerned with the common chord major.

Particular attention is also due to those notes of the key, on which the common chord major is (in the major mode) taken; viz. the *tonic*, *subdominant*, and *dominant*. "The tonic, dominant, and subdominant," says Weber, "belong the more strictly and intimately to every key, as its principal elements; they are the heads of the family; they determine its character; and they most distinctly impress the key on the ear." (G. Weber on Composition, translated from the German, p. 260.) The same writer also designates the harmonies of the tonic, dominant, and subdominant, as the *essential*, and those of the other notes as the *accessory*, harmonies. (Ibid. pp. 259, 284.) Of these 3 notes, however, it is the *tonic* (or, as it is called in melody, the *key-note*) which occupies the most remarkable, and important place. "The judgment of the ear, and the sentiment of pleasure, or of offence, from musical sounds, depends upon a comparison of the several degrees of them with one particular tone, either actually expressed, or tacitly understood, to accompany them, which tone is called the key-note; and the degree of this judgment, and of this sentiment, is the talent which is meant to be expressed when it is said one is possessed of a good or a bad ear." (Maxwell, Essay on Tune, 1781, p. 1.)

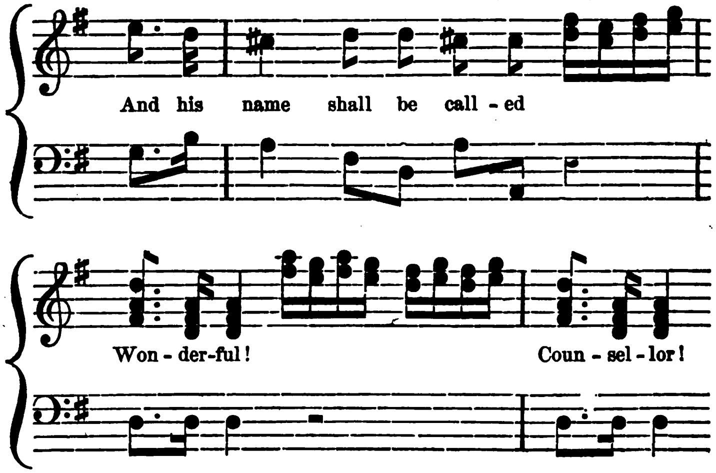
(S), p. 32. The first of these *positions*, viz. $\begin{smallmatrix}8\\5\\3\end{smallmatrix}$ (for example, C E G $\overline{\text{C}}$), is the most important, as affording a harmony to the tonic, and it is that which regularly belongs to the common chord in a Full Cadence (v. sup. p. 78); but in the Treatise of the Rev. W. Jones, of Nayland, he expresses an opinion that the most *harmonious* position is the 2nd, viz. $\begin{smallmatrix}3\\8\\5\end{smallmatrix}$; for example, C G $\overline{\text{C}}$ $\overline{\text{E}}$; for he argues that, instead of E G the minor 3rd, and E $\overline{\text{C}}$ the minor 6th, comprised in the former arrangement, the latter presents us with $G\,\overline{E}$ a major 6th, and $\overline{C}\,\overline{E}$ a major 3rd; and instead of C E a *third* from the key-note, $C\,\overline{E}$ a *tenth* from the key-note, "more agreeable to all ears than a 3rd."

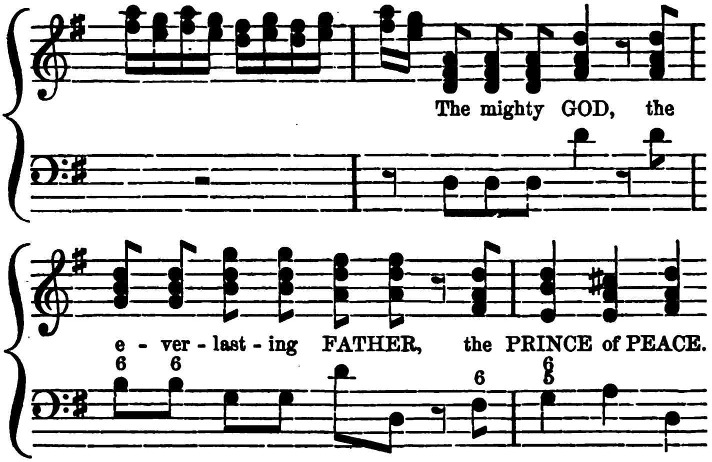
(T), p. 32. It is to the French theorist, Rameau (born in 1683), that the credit is given of having introduced the classification by which some chords are considered as *direct*, and others as mere *inversions* of them, because consisting of the same notes, though the bass notes of the latter chords be different, so as to entitle them in that respect to the character of independent chords. This classification is of great practical use in the science of harmony—at least, as regards some of the particular chords mentioned in the text, viz. the common chords, major, minor, and imperfect, and the chords of the 7th, and the diminished 7th. For all these it is very convenient to consider as *direct* chords; and certain others, differing from them by the mere transposition of the bass notes, as their *inversions*. The classification, indeed, is often carried further, and applied to other chords besides these; but this is attended, in the opinion of the present writer, with no advantage.

(U), p. 34. The musical effect of the common chords major and minor may be illustrated by the following examples, from the two greatest masters of harmony.

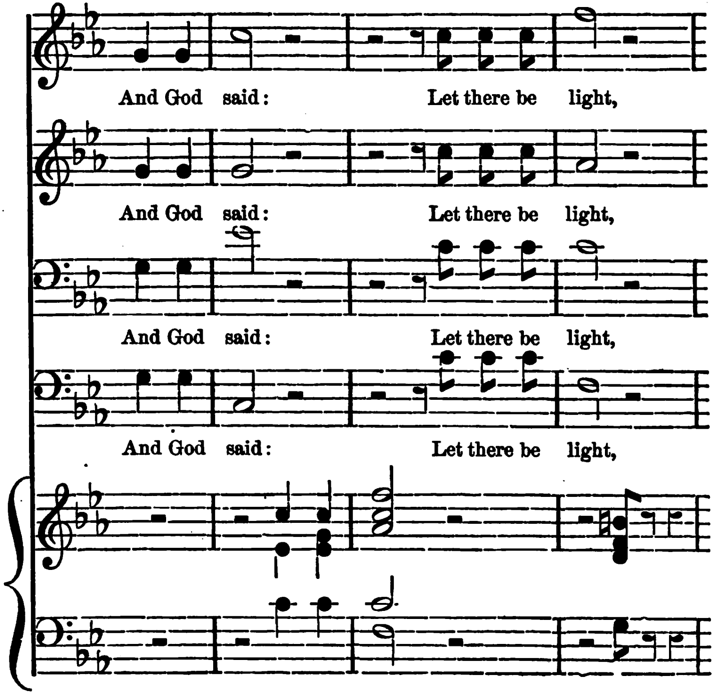
Ex. 1.

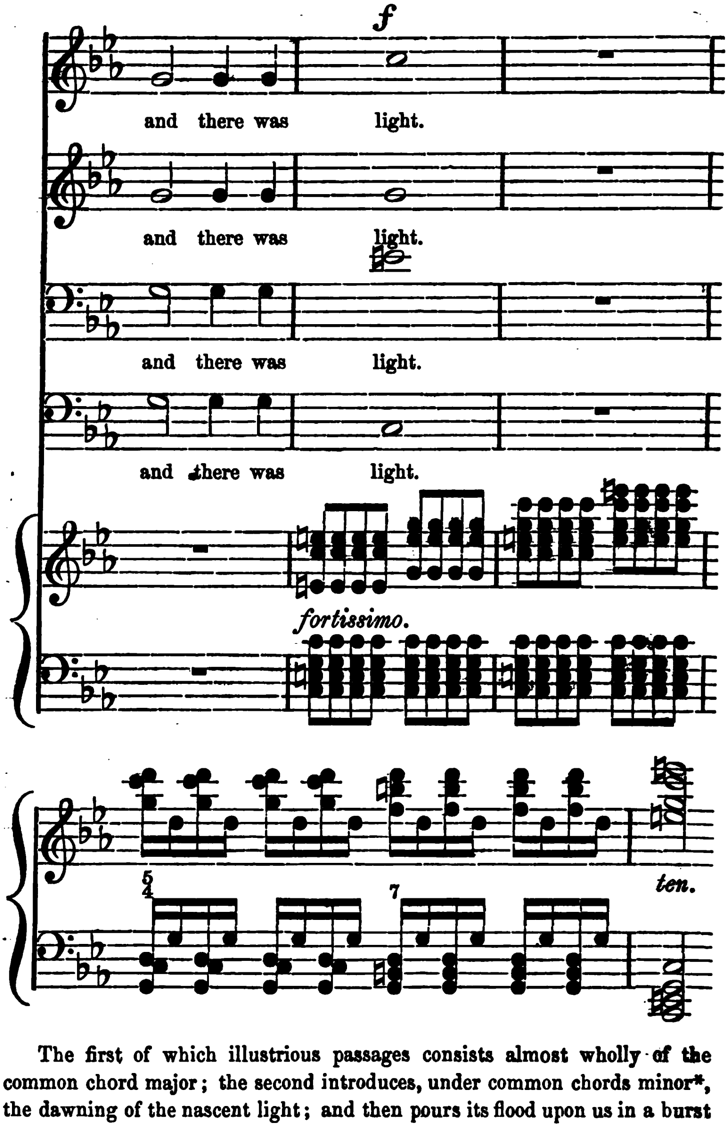
(*Messiah*) *Handel.*





Ex. 2. (*Creation*) *Haydn.*


And God said: Let there be light,
And God said: Let there be light,
And God said: Let there be light,
And God said: Let there be light,



The first of which illustrious passages consists almost wholly of the common chord major; the second introduces, under common chords minor*, the dawning of the nascent light; and then pours its flood upon us in a burst of common chords major†.

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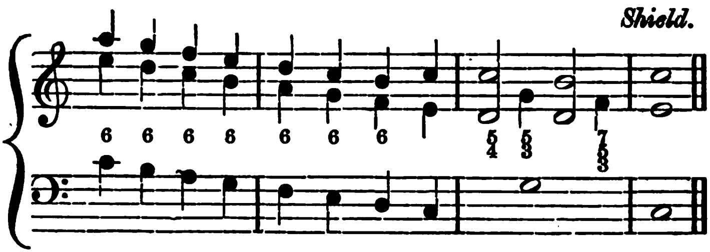
* In the 2nd, 3rd, and 4th bars. † In the 6th and 7th bars.

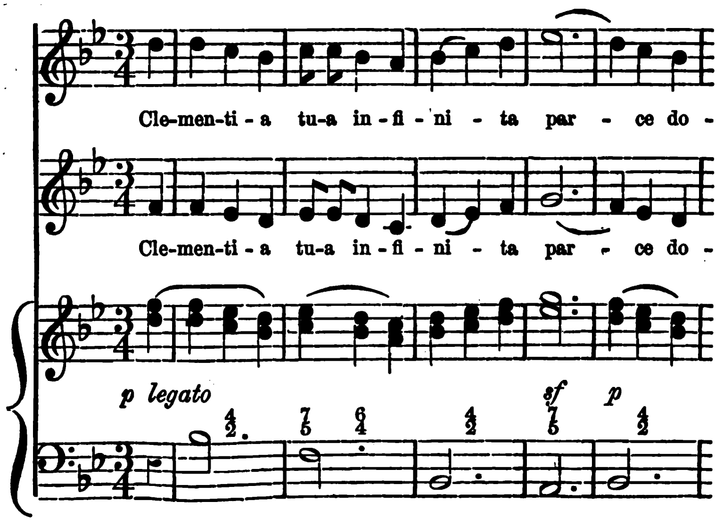
(V), p. 34. The musical effect of the chords of the 6th (v. sup. pp. 33—36), when they are in sequence or series (a case in which they are particularly agreeable) may be illustrated as follows:

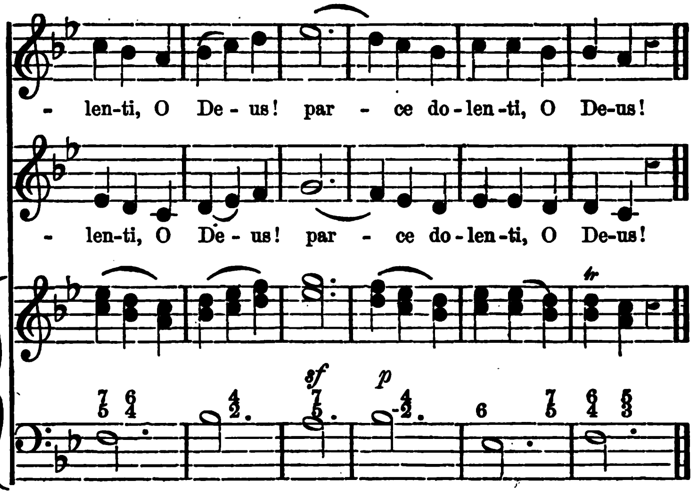
Shield.



The pleasing character of the *interval* of a 6th in series, even when occurring not as a constituent part of a chord of the 6th, but of other chords, may be illustrated by the following example, where intervals of 6ths occur in this manner, between the singing parts:

Un poco Andante. (*Magdalena*) *G. Hasse.*

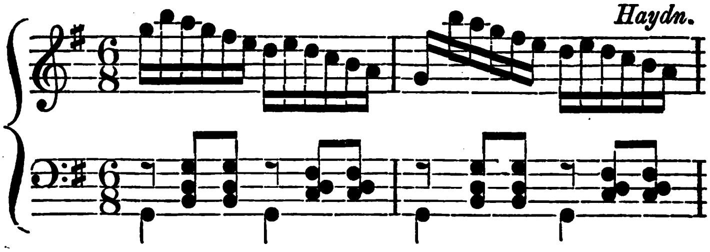

Cle-men-ti - a tu-a in - fi - ni - ta par - ce do -
Cle-men-ti - a tu-a in - fi - ni - ta par - ce do -
p legato
sf p
4 2
7 5
6 4
4 2
7 5
4 2

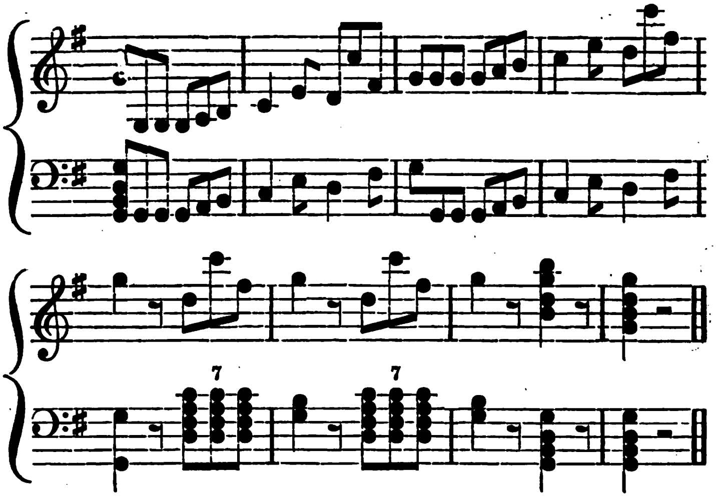

- len-ti, O De - us! par - ce do - len -ti, O De-us!
- len-ti, O De - us! par - ce do - len -ti, O De-us!
sf
p
tr
7 6
5 4
4
2
7
5
4
2
6
7
5
6
4
5
3

(W), p. 35. This chord is called by the German writers the ***diminished triad.*** But, independently of the objection reasonably attaching to the term ***triad,*** as applied to a chord of 3rd, 5th, and 8th (as to which, see note Q), it is both inconvenient and incorrect to apply the term ***diminished*** to any but such extraneous intervals as consist of intervals of the scale diminished by a chromatic semitone (v. sup. p 28). The term ***imperfect common chord*** is free from these objections, and is fully warranted by the authority of numerous authors. This chord is sometimes characterized as the chord of the dominant 7th ***with the bass omitted.*** But to suppose the bass omitted in any chord, seems contrary to the principles of harmony, as it is the bass from which the intervals of every chord are counted, and from which, therefore, it derives its individual character and denomination.

(X), p. 37. The musical effect of the chord of the dominant 7th may be illustrated as follows:

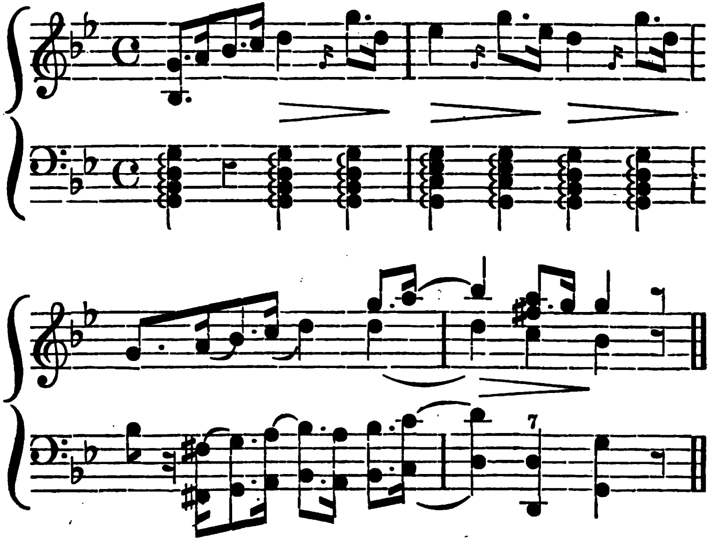
Haydn.





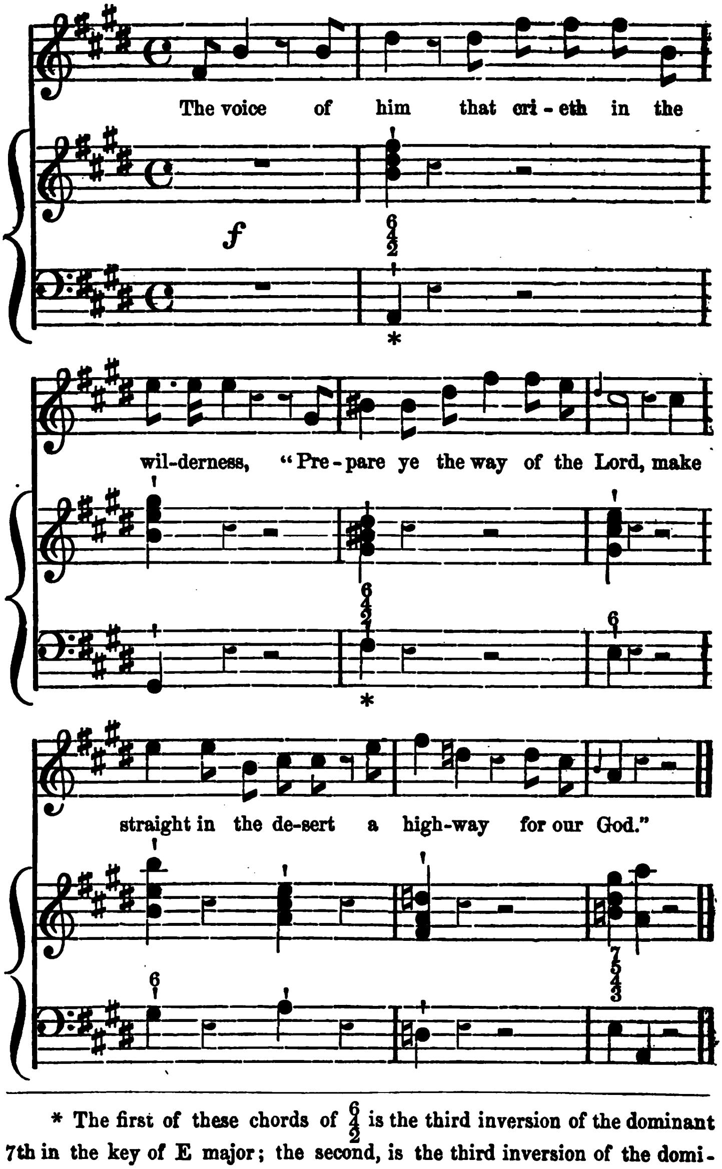
Or by the following in the minor mode:

Kiallmark.



(Y), p. 39. The musical effect of the 3rd inversion of the dominant 7th, may be illustrated as follows:

Handel.

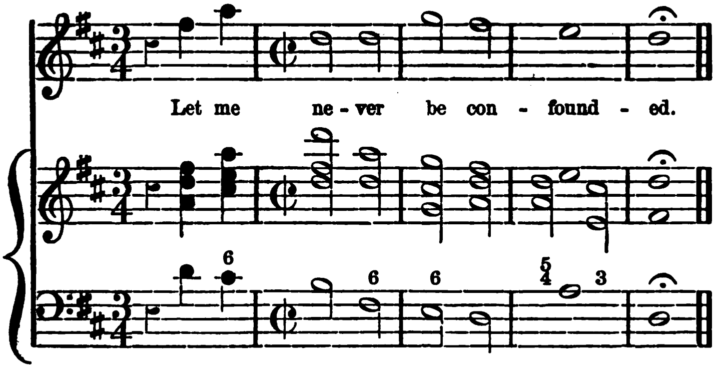

The voice of him that cri - eth in the
f
6
4
2
*
wil-derness, "Pre - pare ye the way of the Lord, make
6
4
2
*
6
straight in the de-sert a high-way for our God."
6
7
5
4
3

---

* The first of these chords of $\begin{smallmatrix}6\\4\\2\end{smallmatrix}$ is the third inversion of the dominant 7th in the key of E major; the second, is the third inversion of the dominant 7th in the key of C♯ minor, into which there is a modulation.

(Z), p. 44. The musical effect of the chord of $\begin{smallmatrix}8\\5\\4\end{smallmatrix}$, may be illustrated by the following example:

Grave. (*Te Deum*) *Handel.*

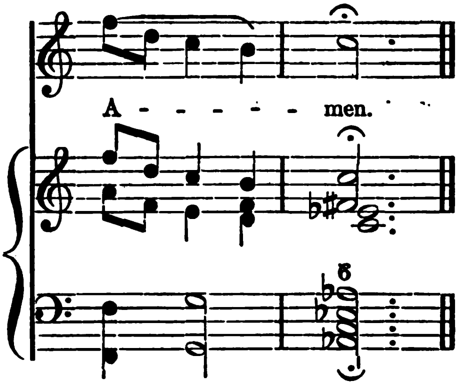


(AA), p. 50. The constitution of this chord of the extreme sharp 6th is usually described in different terms, though the meaning is the same. Reference is made to the 6th in the minor mode, as its bass note. But this is not strictly correct; for the bass note of the extreme sharp 6th is always on the 6th in the minor mode, ascending, *but without its augmentation;* or, according to a convenient description, on the 3rd in the minor mode, descending.

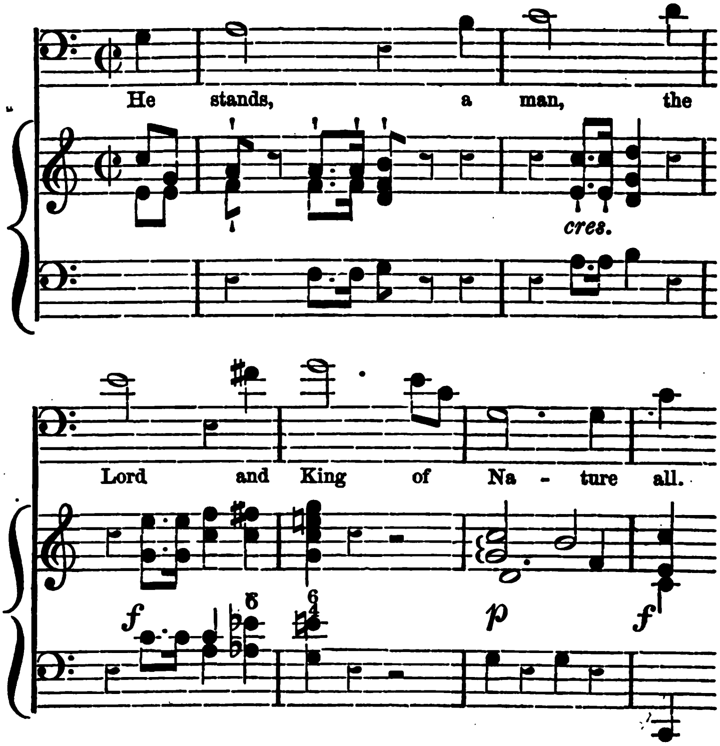
BB, p 52. The chord of the extreme sharp 6th, sup. p. 50, and the chord of the diminished 7th, with its inversions, sup. pp. 51, 52, are the only chords with *altered* intervals (v. sup. p. 27), that are in very familiar use. The following difference between them deserves attention, that the extreme sharp 6th is extraneous both to the major and the minor mode; but the diminished 7th and its inversions are not extraneous to the *minor* mode, though they are so to the *major*. Thus the notes comprised in F A C D♯, in Ex. XXXVII, cannot all be found in the scale of any key in either mode; nor can the notes comprised in G♯ D F B in Ex. XXXVIII be all found in the scale of any key in the *major* mode; but they may be found in the scale of the key of A *minor*, if both its descending and ascending series be taken into account; all which will be at once apparent on examination of the Synopsis in each of these modes, as exhibited, sup. pp. 15, 16.

The chord of the extreme sharp 6th, as might naturally be expected from its *absolutely* extraneous quality, makes a somewhat strange impression upon the ear. It is remarkable, however, for its powerful and pungent effect. The following are examples:

Ex. 1. (*12th Mass*) *Mozart.*

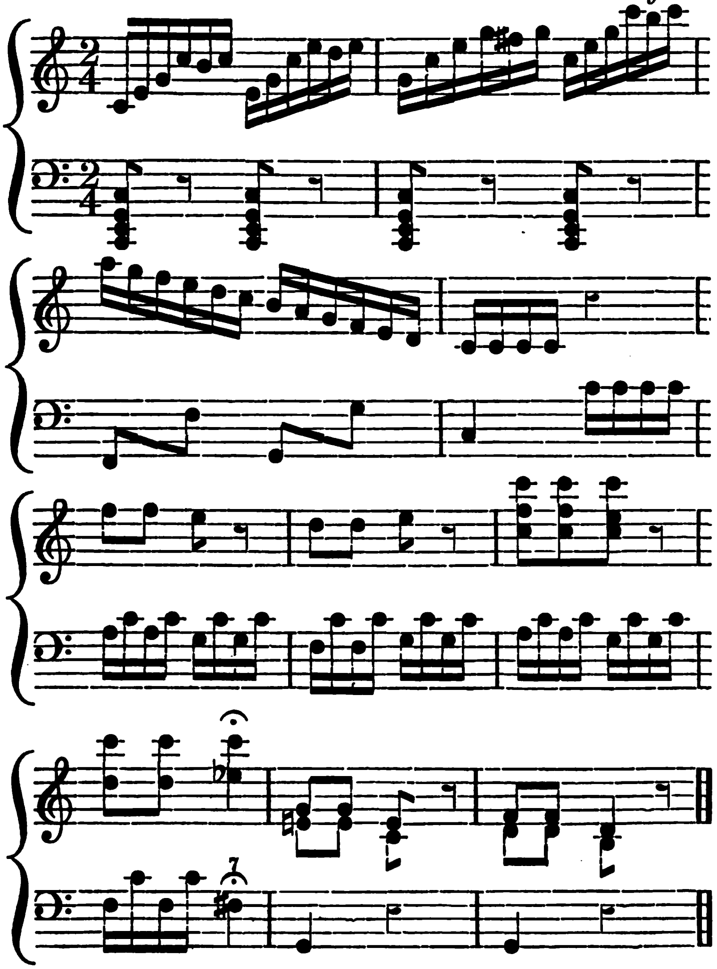


Ex. 2. (*Creation*) *Haydn.*



The chord of the diminished 7th and its inversions are also distinguished by the fine and peculiar expression of various kinds which they are capable of imparting, and also for the services which they render in cadences and modulations. An example of the diminished 7th in modulation, occurs, sup. p. 90. In the following example, this chord occurs in the midst of a passage in C major, and the minor key to which it belongs (viz. G minor) is a *remote* one from the former (v. sup. p. 91); a circumstance that enhances the effect.

Haydn.



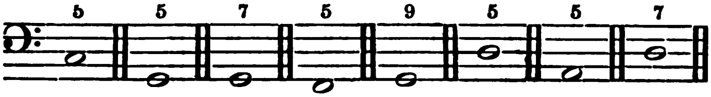
(CC), p. 53. It deserves notice, that 3rds and 6ths are concords capable of alteration; viz. by the difference of a semitone, as expressed by the adjuncts of *major* and *minor*, without ceasing to be concords; but that octaves, 5ths, and 4ths, admit no such alteration, without becoming discords. This distinction is usually expressed by calling the former *imperfect* and the latter *perfect* concords; but it would be more correct, perhaps, to employ the terms *variable* and *invariable*.

As to the 4th, it is to be observed that its quality has been the subject of much controversy, there being many writers who hold it a discord. But the classification of it as a concord is much more common, and is warranted by the better authorities. According to the definition given in the text of concordant intervals—viz. that they are such as are comprised within some common chord major—the 4th clearly belongs to that class; for there is always some common chord major in which every 4th is comprised. Thus, the 4th, $G\ \overline{C}$, is comprised within the common chord major, C, E, G, $\overline{C}$. But, it is to be observed, that the place which the 4th occupies in the common chord is *between two upper parts*, as in the example just given, and not *between the bass and an upper part*; and that when the 4th occurs, in music, in a position different from that which it occupies in the common chord—viz. when it occurs between the bass and an upper part (as in the chord of $^{6}_{4}$, *G*, *C*, E, $\overline{C}$,)—it strikes the ear as a sort of discord, and apparently for this reason, that it is felt as a concord *out of its right place*.

(DD), p. 54. "These discords, the tritone and semi-diapente" (the old name for the minor 5th), "as also the 2nds and 7ths, are of very great use in music, and add a wonderful ornament and pleasure to it, if they be judiciously managed. Without them, music would be much less grateful, like as meat would be to the palate without salt or sauce." (Holder, on Harmony, p. 169.) With respect to 2nds, however, it is to be observed, that the term 2nd is to be understood here in the sense in which it is always used in the present treatise; viz. as applying to a note which differs from another by the interval of a *whole* tone (v. sup. p. 23); for though a note which differs from another by the interval of a *semitone* only, is in some sense a 2nd to that note (being removed from it only by a single degree), yet it is a 2nd of a very different quality, and unfit, generally speaking, for harmonical use. "The less second, or semitone," says another writer, "is a much more harsh and impracticable discord than the greater 2nd, or whole tone. The former of those can only be admitted seldom, and with great caution; but the latter is very often introduced. Thus the 7th and key-note, or the 3rd and 4th of the scale, are seldom joined in harmony, these being intervals of a semitone only; but the key-note and 2nd, or the 4th and

5th, or the 5th and 6th, or the 6th and 7th of the scale, are often set together, these being all intervals of a whole tone." Holden, on Music, p. 55.

(EE), p. 56. According to A. Reicha, the following eight concords and discords are those most frequently and regularly used within the compass of the same key, in the major mode:

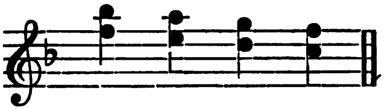


The inversions are not here taken into account.

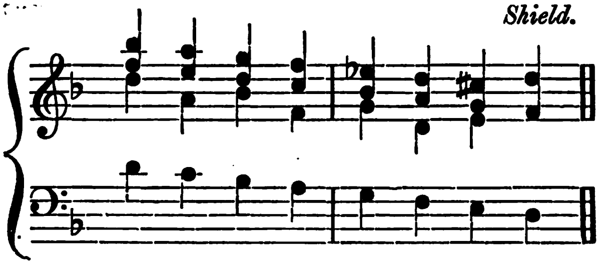
(FF), p. 58. It is to Rameau, before mentioned, that we seem to be also indebted for developing the idea of a *fundamental bass*, as distinguished from an actual bass; an idea, indeed, that immediately resulted from the fact already known in his time, that any note, when struck, produces not only its principal sound, but those also of its 8th, 12th, and 17th ascending; or, in other words, its common chord major (v. sup. Note R). For it was a corollary from this, that if any common chord major be taken, its actual bass (or lowest note) is also its generator,—and, therefore, also of its several inversions; or, as it is otherwise expressed, the *fundamental bass* (or *root*) of all these; while, on the other hand, this fundamental bass is not the actual bass of any of the inversions; for in every inversion the actual bass of the direct chord is transposed. To refer chords in this manner to the same fundamental bass, though the actual bass be different, is occasionally of use, in the study and practice of harmony; and not only as regards common chords major and their inversions (to which alone the idea properly and strictly applies), but also as regards common chords minor and imperfect, and chords of the 7th, and diminished 7th, and their inversions respectively, to which it may be conveniently made to apply for practical purposes. These are the only chords, however, to which, in the author's judgment, a fundamental bass can be usefully assigned; though in some treatises a fundamental bass or root is assigned to chords much more extensively.

(GG), p. 70. This prohibitory rule in music, as to consecutive 5ths and 8ths, has been long established, and is strictly and universally observed. It is therefore the more important to investigate the principle on which it rests. But that principle has never yet been fully agreed upon. Indeed, a recent writer of considerable note represents it as involved in total obscurity. "On ne sait pas encore," says A. Reicha (Harmonie, p. 132), "pourquoi des quintes, de suite, par movement semblable, produisent un mauvais effet."

Various reasons for this rule, however, have been assigned by various authors. Kircher, in his Musurgia, published in 1650, considers consecutive intervals of the same kind as objectionable, simply on the ground of their *want of variety* (*quod nullam varietatem habeant*); and this explanation of the matter, which is perhaps the earliest, seems also to be the best that has been offered. It is observable that consecutive *fourths*, for example:

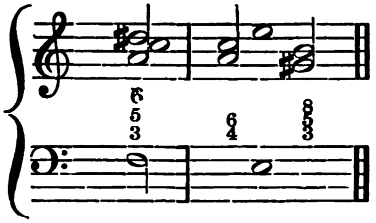


are subject to a similar prohibition, unless combined with sixths or thirds, of which Shield gives the following example, where these 4ths form the uppermost interval, but are accompanied by 6ths and 3rds counted from the bass:



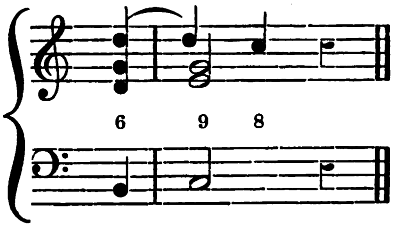
and no reason has ever been suggested for the rule that in its nature would be applicable to *all* these prohibited cases of consecutive 5ths, 8ths, and 4ths, except the want of variety, which, on the other hand, *does* apply to them all. The case of the *thirds* also, strongly tends to the same conclusion; for the succession of a major and a minor 3rd exhibits some variety which that of two major 3rds does not; and accordingly, in Holder's time, who wrote in 1694, it was already held, as it still is, that the former was entirely unobjectionable; but, he adds, that the latter is to be used sparingly, and, like a discord, only "to give, after a little grating, a better relish" (Holder, Treatise on Harmony, p. 85). The same view is also confirmed by the exception above referred to in the case of consecutive *fourths*; viz. that of their becoming allowable when combined with 6ths or 3rds. See also Note (HH), post.

(HH), p. 73. It is very common to prevent the consecutive 5ths here, by interposing a chord between them, thus:



But that consecutive 5ths, as in the text (Ex. 3, p. 72), are entitled to toleration at least, seems to be generally admitted by musical ears (see Albrechtsberger, vol. i, p. 24, Note by M. Choron). Various reasons have been assigned for this peculiarity; among others, that the consecution is, in this case, occasioned by the resolution of a discord (Gunn's Introduction to Music, p. 226). But why the progression should be rendered inoffensive by that circumstance, it is difficult to perceive. The true ground on which the ear tolerates the successive 5th in this case, may perhaps be discovered by referring to the principle on which the rule against successive 5ths is itself accounted for in a former note (see note GG). It is the *want of variety* involved in a repetition of the same interval between the same parts that was there supposed to be the real objection felt by the ear to such a succession in general. But in the particular succession now in question, though each chord contains a 5th between the same parts, yet there is so far a variety, that the first chord is absolutely *extraneous*, and the second *belongs to the scale*.

(II), p. 75. As to the cases in which *preparation* may be dispensed with, no clear rule appears to exist. They depend a good deal upon the musical taste of the day, and it may be remarked that there is more laxity than there once was as to *preparation*. It is worth while to mention here, a species of prepared discord, called a *discord of suspension*. This may be defined, in a general way, as a prepared discord which contains some portion of the concord, into which it is about to resolve. Thus:

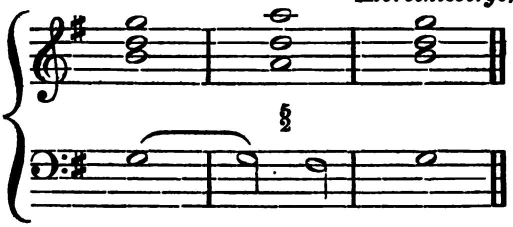


where the discord of suspension C E G D is prepared by the D, and contains C E G, which is a portion of the concord, C E G C, that follows it.

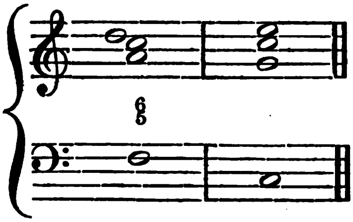
In such a case, the concord, from having been *suspended*, as it were, by the discord, is the more acceptable to the ear when it comes.

(JJ), p. 76. In Albrechtsberger's Treatise, vol. i, p. 46, it is laid down: "All the consonances may be doubled, but not the dissonances, because their harmony is too harsh, and they produce successions of perfect octaves by their resolution." The rule, however, is subject to several exceptions, as noticed in the text; and *inter alia* is subject to exception in the case of the chord of of the $\substack{5\\2}$; where the 2nd or 5th may be doubled, as in the following example, where the 2nd is doubled:

Albrechtsberger.



(KK), p. 78. The first inversion of the Chord of the 7th on the 2nd, in Example 3, p. 79, in the text, and which is there resolved by the descent of the 5th, is also capable of being resolved in another way; viz. by the ascent of the 6th. Thus:



In this latter case, Rameau and his followers made it a *different* chord from the first inversion of the chord of the 7th on the 2nd (though the two chords were no otherwise distinguishable than by the manner of the resolution), and called it the *chord of the added 6th*, considering it as the common chord of the subdominant *with the 6th added.* This anomalous arrangement, adopted only to justify some fanciful doctrines of Rameau with respect to the progression of the fundamental bass, has been much followed also in England. It is time, however, to lay it aside, and to classify this chord, in every case, and whatever may be the mode of its resolution, as the first inversion of the chord of the 7th on the 2nd. In the text is also mentioned (in example 2, p. 78) the first inversion of the common chord minor on the 2nd, sometimes called the *Substituted 6th;* by which last-mentioned term is meant a common chord with a 6th substituted for a 5th: and the term is analogous to that of *Added 6th.* But both terms are equally opposed to sound principle. The 1*st inversion of the chord of the 7th on the 2nd,* and the 1*st inversion of the common chord minor on the 2nd,* are the only proper appellations.

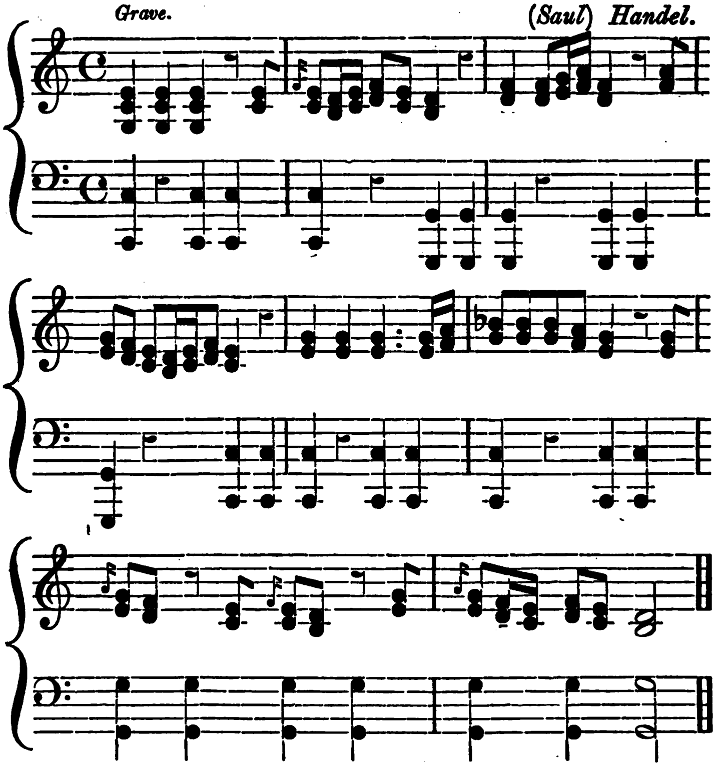
(LL), p. 80. The words *authentic* and *plagal* are derived from the old ecclesiastical music. They occur, at present, rather in treatises than in familiar musical language. The plagal cadence, or cadence from the subdominant, is used principally in Church Music. Callcott refers to examples of it in the Hallelujah Chorus and Coronation Anthem.

(MM), p. 80. The *imperfect* cadence seems to have beeen formerly called a *middle* cadence. For Pepusch (the contemporary of Handel), who has been described as the most *orthodox* writer of his day, thus expresses himself: " Cadences in music are the same as stops in speaking or writing; for which reasons they are distinguished into full cadences and middle cadences. These last are like commas and semicolons, after which more is expected to follow, they not making so full a stop as the others; whereas, after a full cadence, we are sensible that we are come to a conclusion."

(NN), p. 92. Modulation is one of the chief sources of musical expression; and there is one particular course of modulation which is sometimes so powerfully applied to purposes of pathos, that it seems to deserve specific notice; viz. that which consists in introducing a note flatter by a semitone than the antecedent progression in the original key would naturally lead the ear to expect; as in the following examples—the first, remarkable for the thrilling sadness of its B flat; the second, for the religious awe and veneration of its C natural:

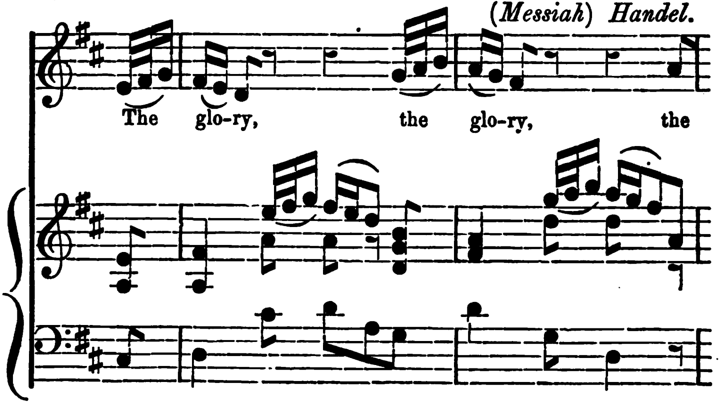
1st Example.—A modulation from the key of C major into the key of F major:

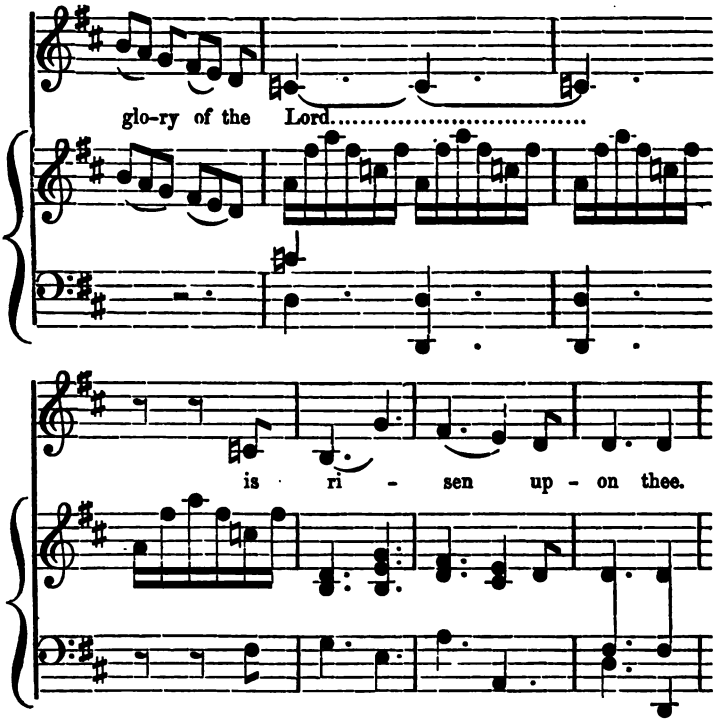
Grave. (*Saul*) *Handel.*



2nd Example.—A modulation from the key of D major into the key of G major:

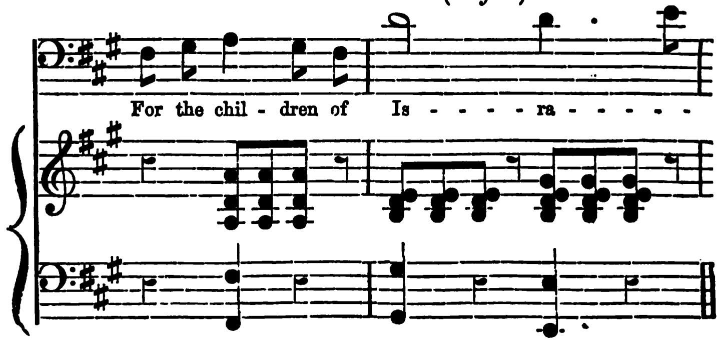
(*Messiah*) *Handel.*

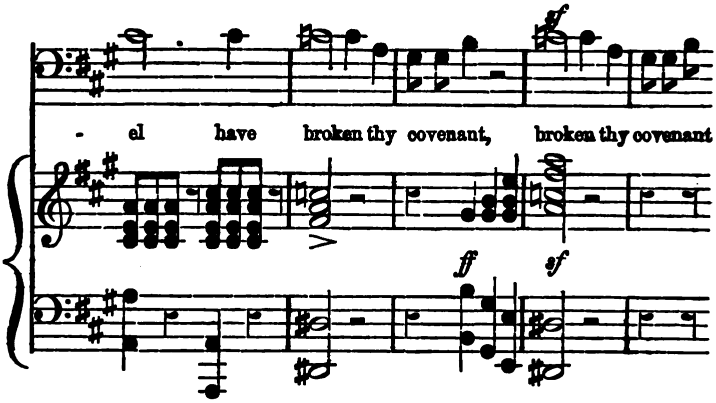



glo-ry of the Lord.................................
is ri - sen up - on thee.

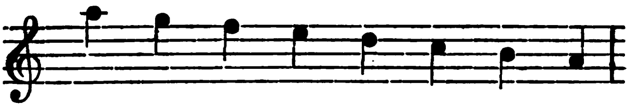
It is to be observed, however, that an unexpected semitonic descent of this kind is also capable of being produced *without* a modulation; viz. by the mere employment of an extraneous discord introductory of no new key; and that when so produced, its power is as perceptible as in the former case. In the following example, so finely expressive of mournful indignation, the effect is due to the unexpected introduction of C natural in the chord of the diminished 7th, D♯ F A C, which takes place without any modulation:

(*Elijah*) *Mendelssohn.*

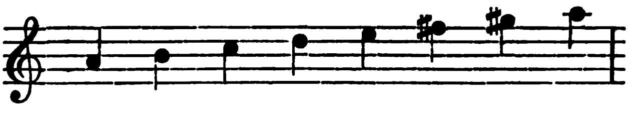




(OO), p. 94. In general, all Chromatic passages involve changes of key. For there can be no such passages without chromatic semitones, and as in general the only semitones in the scale of any key are those of the diatonic kind, it follows that in general no chromatic passage can be introduced so long as that key is adhered to. But to this there is an exception; for, in the ascending series of the minor mode, there are chromatic semitones in the scale of the key itself, as shewn, sup. pp. 12, 13, where we have seen that, though in the descending series of the minor mode, the scale of the key—for example, the key of A minor—is without a chromatic semitone, thus:

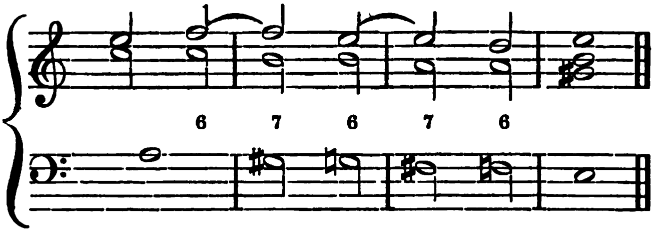


yet, in the ascending series, it has a chromatic semitone at the 6th and at the 7th note; thus:



For these notes are *augmented*, that is made sharper by a chromatic semitone than the notes which represent them respectively in the descending series. This being the case, a chromatic passage may be formed without departing from the key itself, if we avail ourselves both of the ascending and descending series of some key in the minor mode; thus:

Rev. W. Jones.



For this is a chromatic passage; and the whole of it lies within the key of A minor, consisting as it does of both the ascending and descending series.

(PP), p. 97. In reference to the subject of this chapter, it will be convenient to explain the method of calculating ratios; for which we may refer generally to Holder on Harmony, and Malcolm on Music.

1. *To add one ratio to another.*—Turn them into fractions, and multiply continually the numerators into the numerators, and the denominators into the denominators. The last product is the answer. Ex. Add 2 : 3, 5 : 7, and 8 : 9 together, $\frac{2\times5\times8}{3\times7\times9} = \frac{80}{189}$ or 80 : 189 the answer.

2. *To subtract one ratio from another.*—Turn them into fractions, and multiply them crosswise. Ex. Subtract 3 : 2 from 5 : 3.. $\frac{5}{3}\times\frac{3}{2} = \frac{10}{9}$. or 10 : 9 the answer.

3. *To multiply a ratio by a whole number.*—Add the ratio to itself (by the rule) as often as is expressed by the whole number, and the sum will be the answer. Ex. Multiply 2 : 3 by 4.. $\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3} = \frac{16}{81}$ or 16 : 81 the answer.

4. *To divide a ratio by a whole number.*—Find such a ratio as, being added to itself as often as the whole number expresses, will produce the given ratio, and this will be the answer. Ex. Divide 9 : 16 by 2, $\frac{9}{16} = \frac{3}{4}\times\frac{3}{4}$. Therefore $\frac{3}{4}$ or 3 : 4 is the answer.

(QQ). p. 97. See Arnott's Physics, vol. i, p. 511; and other authorities. If these fractions be reduced to a common denominator of 24, the ratios may be expressed as follows:

C	D	E	F	G	A	B	$\overline{\text{C}}$
24	27	30	32	36	40	45	48

(RR), 98. See Benjamin Stillingfleet, on Harmony, p. 39. This may be proved from the ratios to the key note (sup. p. 97), as follows:

$$\text{C} = 1;\ \text{D} = \frac{9}{8};\ \text{E} = \frac{5}{4} = \frac{9}{8} \times \frac{10}{9};\ \text{F} = \frac{4}{3} = \frac{5}{4} \times \frac{16}{15};$$

$$\text{G} = \frac{3}{2} = \frac{4}{3} \times \frac{9}{8};\ \text{A} = \frac{5}{3} = \frac{3}{2} \times \frac{10}{9};\ \text{B} = \frac{15}{8} = \frac{5}{3} \times \frac{9}{8};$$

$$\overline{\text{C}} = 2 = \frac{15}{8} \times \frac{16}{15}$$

(SS), p. 98. "Most people," says Benj. Stillingfleet, in his Treatise on Harmony, p. 32, "will be apt to think that there was not much thought required to settle the common octave, which almost any one that has an ear can run over with the greatest ease, and, as he thinks, naturally. Yet there were many divisions of it proposed before that was invented which now takes place. Ptolemy, the astronomer, was the inventor; and it is no wonder that it has generally prevailed from his time to this day, as it is the only one which was truly founded in nature. We are taught to go through it after a manner, and are even often apt to look upon it as natural; but it is undoubtedly artificial, and the result of much profound thought. However paradoxical, therefore, it may seem, it is certainly true that harmony is more natural than the notes of the octave; for a string cannot be sounded without producing harmony." (He alludes here to the natural generation of the common chord, as explained, sup. pp. 119, 131.) "Whereas the notes of an octave" (by which he means the notes of the scale of the octave) "never appear but in highly civilized countries. Amongst the birds, we hear the 5th, the 4th, the 3rd major and minor; but the notes of the octave, from no animal that has not been taught," &c.

The fact stated in the course of this extract, that many different scales preceded that which now prevails in civilized Europe, is abundantly proved by the Greek treatises on music, still extant, and collected by Meibomius; and by the accounts given even of the modern music of many of the oriental nations. Thus, in the preface to the learned Treatise of M. Fétis, it is said that among the Persians the scale was, from an ancient period, divided into quarter tones; and that the Persian musicians whom Amurath IV carried captive to Constantinople, after the taking of Bagdad, in 1638, introduced this scale into Turkey, where it was still in use at the close of the 18th century; and the Letteratura Turchescha of Toderini is cited in support of this statement. That the present scale, therefore, was in the nature of a progressive invention, and not a system of sounds that nature instinctively and at once inculcates, is unquestionable. The claim of Ptolemy, however, to be considered as the inventor is doubtful. The honour seems rather to belong to Didymus, the musician, of Alexandria, who preceded him; and who, as appears by the writings of Ptolemy himself, had already suggested the interval of the minor tone, 10 : 9 (Malcolm on Music, p. 515, Rees' Cyc. Art^{s}. Didymus, Ptolemy), an interval which seems to have been unknown to the ancient Greeks, though they had discovered the major tone 9 : 8. (Holder, on Harmony, pp. 150—152.)

(TT), p. 102. This, according to the best authorities, is the ratio of the major 6th. It is stated, however, by some writers as $\frac{27}{16}$; the scale, according to them, being

C	D	E	F	G	A	B	$\bar{C}$
1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{27}{16}$	$\frac{15}{8}$	2

which makes the ratios between contiguous notes—

C to D	D to E	E to F	F to G	G to A	A to B	B to C
$\frac{9}{8}$	$\frac{10}{9}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{9}{8}$	$\frac{10}{9}$	$\frac{16}{15}$

And it is observable that this ratio of $\frac{27}{16}$ is the one which would, in fact, belong to the 6th, if, in the formation of the scale, the multiplication by 3 were carried one step farther than was supposed at p. 100; that is, if, after obtaining the note D, by the multiplication of 3 × 3, the next step were to multiply again by 3; for $3 \times 3 \times 3 = 27$, and 27 brought down so as to fall within the compass of the first octave, would become $\frac{27}{16}$. It may also be observed, as to the arrangement of contiguous notes thus produced, that it would consist of two disjunct tetrachords exactly similar; for the intervals in each case would be $\frac{9}{8}, \frac{10}{9}, \frac{16}{15}$; but if we take $\frac{5}{3}$ as the ratio of the major 6th, the tetrachords are *not* exactly similar, the intervals of the first being $\frac{9}{8}, \frac{10}{9}, \frac{16}{15}$ and of the 2nd, $\frac{10}{9}, \frac{9}{8}, \frac{16}{15}$ (v. sup. p. 98). On the other hand, however, it is to be remarked that $\frac{27}{16}$ is a *discordant* interval, and $\frac{5}{3}$ a *concordant* one.

(UU). p. 103. The minor 7th is here taken as the interval between the 3rd of the key, and the upper octave of the 2nd in the major mode—for example, as E D in the key of C major. In this case its ratio is $\frac{9}{5}$. For the ratios as between contiguous notes are:

E to F	F to G	G to A	A to B	B to C	C to D	
$\frac{16}{15}$	$\frac{9}{8}$	$\frac{10}{9}$	$\frac{9}{8}$	$\frac{16}{15}$	$\frac{9}{8}$	$= \frac{9}{5}$ or $\frac{3\times3}{5}$

But if taken as the interval between the 5th and the upper octave of the 4th, in the major mode, for example, as G F, in the key of C major, its ratio is $\frac{16}{9}$. For the ratios as between contiguous notes, then are

G to A	A to B	B to C	C to D	D to E	E to F	
$\frac{10}{9}$	$\frac{9}{8}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{10}{9}$	$\frac{16}{15}$	$= \frac{16}{9}$ or $\frac{2\times2\times2\times2}{3\times3}$

(VV), p. 104. Taking C as 1, C E is a major 3rd, $\frac{5}{4}$ (v. sup. p. 97); and E G♯ is another major 3rd, $\frac{5}{4}$; and, consequently, C G♯ is $\frac{5}{4} \times \frac{5}{4} = \frac{25}{16}$ the difference between which and $\frac{3}{2}$, the ratio of the 5th, C G, is $\frac{25}{24}$. But the difference between C G and C G♯ is the interval of the chromatic semitone G G♯ (v. sup. p. 27). Therefore $\frac{25}{24}$ is the ratio of the chromatic semitone. It may be observed, that this is less than the diatonic semitone of $\frac{16}{15}$ by $\frac{128}{125}$, being the ratio of the enharmonic interval.

(WW), p. 105. If the minor 7th be taken as $\frac{16}{9}$ (v. note (UU), then the diminished minor 7th (which is the minor 7th diminished by a chromatic semitone) $= \frac{16}{9} - \frac{25}{24} = \frac{128}{75}$. But if the minor 7th be taken as $\frac{9}{5}$, then the diminished minor 7th $= \frac{9}{5} - \frac{25}{24} = \frac{216}{125}$.

(XX), p. 112. "Tartini considered the quintuple proportion as unfit for melody, and impossible to be executed. Time has shown that neither of these judgments is well founded."—Callcott's Grammar, p. 40. The instances, however, of this species of time are extremely rare.

FINIS.

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